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Building Stone Potential in Eastern Ontario

1989

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MINES AND MINERALS DIVISION

ONTARIO GEOLOGICAL SURVEY

Open File Report 5706

Building Stone Potential in Eastern Ontario

by

P.S. Lebaron, C.P. Verschuren, V.C. Papertzian,
and P.W. Kingston

1989

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BUILDING STONE POTENTIAL IN EASTERN ONTARIO

by: P.S. LeBaron, C.P. Verschuren, V.C. Papertzian,
and P.W. Kingston

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ABSTRACT

The building stone industry in North America has experienced substantial growth in recent years, and interest in developing local sources of stone has increased correspondingly. Eastern Ontario has historically produced various stone commodities such as terrazzo chips, flagstone, structural stone, monument stone, ornamental stone and architectural stone from Precambrian rocks (plutonic rocks, gneisses, and marble) of the Grenville Province and from Paleozoic rocks (sandstone, limestone, and dolostone) of the St. Lawrence Platform.

This study, focussing primarily on the plutonic rocks of the Central Metasedimentary Belt of the Grenville province but also including numerous marble, and some limestone prospects, has identified several areas with good building stone potential. The prospects, over 200 of which were examined in the field, were evaluated with respect to joint pattern and intensity, colour, texture, and deleterious mineral content. Because of the complex metamorphic and structural history of the Grenville Province, areas with limited jointing and consistent colour and texture required by the building stone industry are rare. The most promising area is the high-grade metamorphic terrain of the Frontenac Axis, which hosts eastern Ontario's only currently-producing granite dimension stone quarry (Battersea, Storrington township). However, local areas west of the Frontenac Axis also have good potential for granite and marble building stone development, particularly as relatively small quarry operations to supply markets in southern Ontario.

BUILDING STONE POTENTIAL IN EASTERN ONTARIO

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PART I

INTRODUCTION

This report presents the final results of a multi-year study on the granite and marble building stone potential of eastern Ontario. Some of the information has been previously published in Ontario Geological Survey Open File Reports 5556 (Verschuren et al, 1985) and 5585 (Verschuren et al, 1986).

Open File Report 5556 presented a general introduction to the building stone industry (deposit criteria, terminology) and the results of a literature search for building stone occurrences and aggregate quarries in eastern Ontario. This work was followed by field investigations of building stone occurrences which appeared based on the literature, to have potential for development. In addition, a reconnaissance survey was initiated to examine new areas considered to have building stone potential based on a study of geological reports. Open File Report 5585 documented the results of the 1985 field work and literature search. In 1986, the reconnaissance survey was completed and samples were obtained for cutting and polishing from prospects considered to have the highest potential for development. All results of the 1986 field work and a summary of the results of previous work are included in this report.

A study of the building stone potential of Paleozoic rocks of eastern Ontario is to be initiated in 1988 with a report forthcoming in 1989.

Study Objectives

The building stone industry in North America is experiencing a period of substantial growth, with a return to traditional building styles which make use of natural stone as both structural and decorative material. North American producers are currently expanding and up-grading stone processing facilities in an attempt to become more competitive with foreign suppliers of building stone (Meade, 1986). This investment has resulted in reduced finishing costs which, in turn, has generated interest in opening new deposits.

The stone industry in eastern Ontario has produced various commodities including roofing granules, terrazzo chips, slate products, flagstone, construction blocks, ornamental stone, and dimension stone. Source rocks for these products are plutonic rocks, marble, slate, sandstone, and limestone. The availability of resources and a substantial market in eastern Ontario should encourage the initiation of exploration programs by the private sector.

The purpose of this study is to provide information based on literature searches and field work which will be useful in developing exploration programs for building stone in eastern Ontario. Because of the limited potential for commercial slate in the study area, emphasis has been placed on identifying areas of granite and marble with potential for development.

Organization of the Report

This report is divided into three parts:

Part I, Introduction -- contains background information on the building stone project and on the geology of the study area.

Part II, The Building Stone Industry -- provides a general introduction to various aspects of the industry, describing commodity definitions and uses; market trends and outlook; building stone deposit criteria; quarry economics; and ASTM tests.

Part III, Building Stone Potential in Eastern Ontario -- describes the current state of the industry in eastern Ontario; the results of 1985 and 1986 field work; and provides evaluations of the areas examined and recommendations for exploration.

Detailed reports on each site examined in 1986 are included as an appendix, as is a table summarizing the features of sites examined in 1985. Detailed reports on the 1985 sites are available in OGS Open File Report 5585 (Verschuren et al, 1986).

Location of the Study Area

Figure 1 shows the townships in which properties were examined in 1985 and 1986. The western limit of the study area extends roughly from Lake Simcoe to Lake Nipissing, including parts of the eastern shore of Georgian Bay. The eastern boundary extends

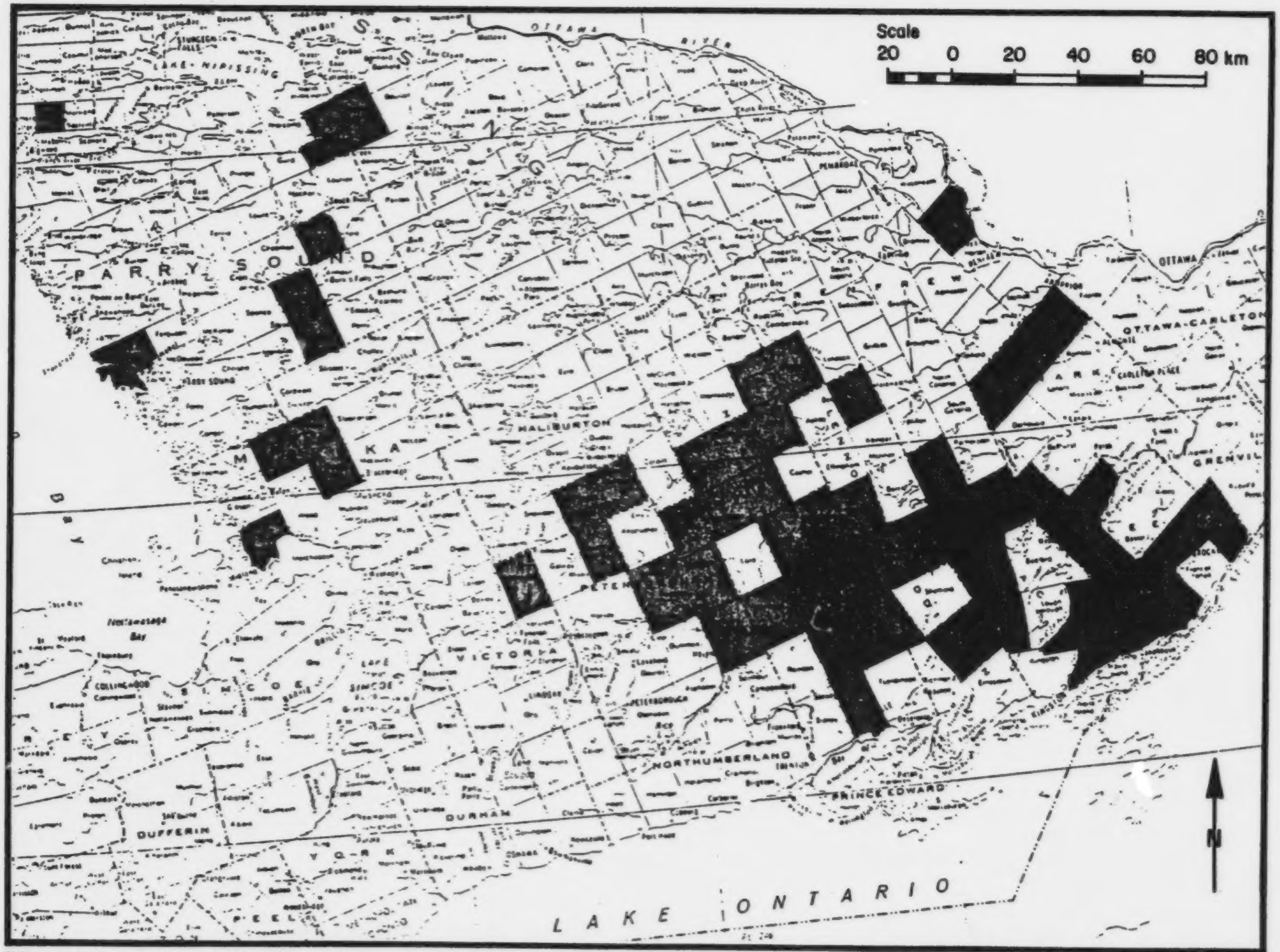

Scale
20 0 20 40 60 80 km
N
OTTAWA RIVER
LAKE NIPISSING
PARRY SOUND
HALIBURTON
RENFREW
OTTAWA-CARLETON
GRENVIL
VICTORIA
PETERBOROUGH
NORTHUMBERLAND
PRINCE EDWARD
SIMCOE
DURHAM
YORK
PEEL
DUFFERIN
Nottawasaga Bay
LAKE ONTARIO

Figure I: Location of the Study Area, showing townships in which building stone prospects were examined.

from the Brockville area to the Pembroke area. The results of 1985 examinations in the Lake Simcoe to Lake Nipissing area are summarized in this report. A more detailed study of building stone potential in that area -- the Ontario Gneiss Segment of the Central Gneiss Belt (Fig. 2) -- is currently being conducted by the Ontario Ministry of Northern Development and Mines, Dorset (Marmont and Johnston, 1987).

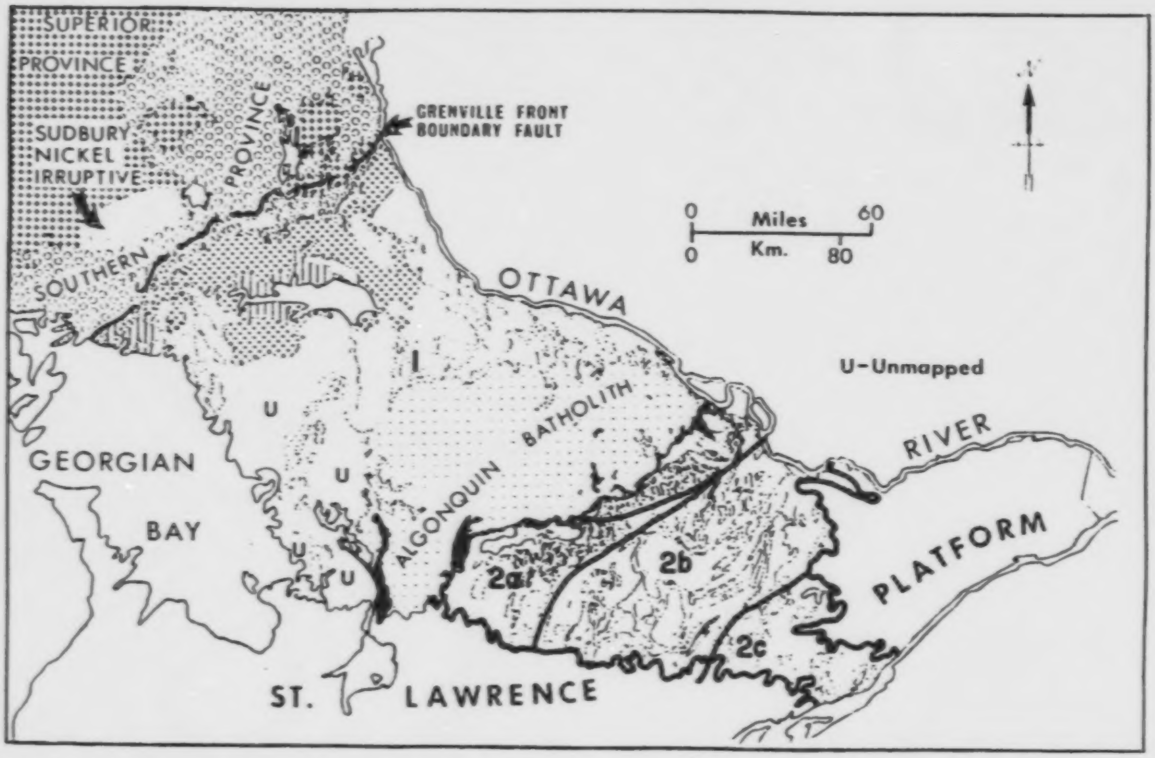
This report deals primarily with Precambrian rocks of the Central Metasedimentary Belt and, to a lesser extent, the Paleozoic rocks of the St. Lawrence Platform (Fig. 2) in the counties of Peterborough, Hastings, Lennox and Addington, Frontenac, Leeds, and Lanark.

General Geological Setting

The study area is underlain by Precambrian rocks of the Grenville Province, except in the extreme southern and eastern parts where the Grenville is overlain by undeformed Lower Paleozoic sedimentary rocks of the St. Lawrence Platform (Fig. 2). The following descriptions are summarized from Wynne-Edwards (1972).

The Grenville Province in central and eastern Ontario has been subdivided into the Ontario Gneiss Segment of the Central Gneiss Belt and the Central Metasedimentary Belt. Some areas of the Ontario Gneiss Segment were examined in 1985, but the primary focus of this report is the Central Metasedimentary Belt.

The Ontario Gneiss Segment is dominated by quartzo-feldspathic gneisses with local areas of marble, quartzite, and paragneiss of


SUPERIOR PROVINCE
SUDBURY NICKEL IRRUPTIVE
SOUTHERN PROVINCE
GRENVILLE FRONT BOUNDARY FAULT
0 Miles 60
0 Km. 80
OTTAWA
RIVER
U-Unmapped
I
U
U
U
U
GEORGIAN
BAY
ALGONQUIN BATHOLITH
2a
2b
2c
PLATFORM
ST. LAWRENCE

LEGEND

PHANEROZOIC

☐ Unsubdivided Paleozoic sedimentary rocks

PRECAMBRIAN

GRENVILLE PROVINCE

Late Proterozoic

▨ Alkalic plutonic rocks

☐ Unsubdivided plutonic rocks

☐ Metavolcanics

☐ Carbonate and other metasediments

■ Coarse clastic sequence

UNCONFORMITY

⁙ Algonquin batholith (unsubdivided)

Early Proterozoic

▥ Unsubdivided plutonic rocks

▨ Shallow to deep water metasandstone and other metasediments

☐ Deep water turbidite deposits (mainly greywacke-siltstone)

▨ Gneissic metasediments derived from the Huronian Supergroup

▨ Coarse clastic sequence

UNCONFORMITY

Archean

▦ Gneissic Archean plutonic and supracrustal rocks

GRENVILLE AND SUPERIOR PROVINCES

▨ Unsubdivided early Proterozoic rocks of the Southern Province

▦ Unsubdivided Archean rocks of the Superior Province

GRENVILLE PROVINCE SUBDIVISIONS

- I Ontario Gneiss Segment
- 2 Central Metasedimentary Belt
  - a. Glamorgan-Cardiff Belt
  - b. Hastings Basin
  - c. Frontenac Axis

Figure 2: Generalized Geology (from Sims et al, 1981) and Subdivisions of the Grenville Province (from Wynne-Edwards, 1972).

the Grenville Supergroup. The grade of metamorphism is generally upper amphibolite facies. The gneisses are intruded by a variety of mafic to felsic plutonic rocks. These igneous complexes are generally highly deformed by regional metamorphism, but are locally massive to weakly foliated.

The Central Metasedimentary Belt hosts the rocks of the Grenville Supergroup -- a suite of metamorphic carbonates, calc-silicates, quartzites, paragneisses, amphibolites, and metavolcanic rocks. These have been intruded by mafic to felsic plutonic rocks, some of which appear as large areas of granitic and tonalitic gneiss. Metamorphic grade is amphibolite facies at the northwestern margin of the belt, decreasing to greenschist facies at the center of the belt (the Hastings Basin), and increasing to amphibolite and granulite facies in the southeast (the Frontenac Axis).

Paleozoic rocks of the St. Lawrence Platform that lie within the study area include Potsdam or Nepean Formation sandstone, Shadow Lake Formation shale, Oxford Formation dolomite east of the Frontenac Axis, and limestone of the Gull River and Bobcaygeon Formations west of the Frontenac Axis (Hewitt, 1972).

Previous Work

Descriptions of occurrences and past producers of building stone are given in reports by Parks (1912), Goudge (1938), Carr (1955), and Hewitt (1964 b-f).

Geological maps and reports covering most of the study area have been published by the Ontario Geological Survey and the Geological Survey of Canada. References are listed on the property description reports.

Market studies for building stone have been done for northwestern Ontario (Les Consultants Sogir, 1984) and New Brunswick, Nova Scotia, and Newfoundland (DPA Group, 1987).

In reviewing these reports, it should be noted that requirements of the building stone industry have changed, therefore some conclusions which were valid in 1912 or 1955 may require re-evaluation. For example, irregularities such as inclusions or veining which previously have been considered defects may be desirable features in some current building designs, and blocks which were previously considered large at 5 to 10 tons are only about one-half the size now required by the dimension stone industry.

Methodology

The project began with an inventory of building stone occurrences in eastern Ontario, obtained by reviewing the available literature and published in OGS Open File Report 5556 (Verschuren et al 1986). Properties were then selected for further investigation based primarily on apparent potential with respect to large quarry block size. A reconnaissance survey was also initiated in an attempt to delineate new areas with high building stone potential. These areas were selected based on a study of geological reports with emphasis placed on identifying massive to weakly foliated, late-tectonic intrusive rocks.

The reconnaissance survey and quarry examinations were done in the summer and fall of 1985 and 1986. Geological information was recorded on data forms, and photographs of most sites were taken. Petrographic descriptions of the 1985 samples were obtained from thin sections; mineralogy of the 1986 samples was determined from hand specimens.

Upon completion of the property examinations, samples were taken from 51 sites considered to have good potential for building stone development. Samples in the order of 0.3 cubic meters were obtained by plug and feather quarrying and shipped to Oxford Monuments Limited, Woodstock, Ontario where they were cut into 30 X 30 X 4 cm slabs and polished. The polished samples, listed in Appendix 5, can be viewed at the Ministry of Northern Development and Mines Drill Core Library, Tweed. Several samples were subjected to ASTM tests, the results of which are included in Appendix 4 and summarized in Part 3 of this report.

PART II -- THE BUILDING STONE INDUSTRY

COMMODITY DEFINITIONS AND USES

The following terms are commonly used in the stone industry. Rock names often bear little relation to the accepted geological terms.

Ashlar	Roughly rectangular pieces of stone of non-uniform size (5-10 cm thick, up to 0.5 square meters in surface area); used for walls, fences, fireplaces, etc.
Architectural Stone	Thin slabs (1.5 - 3 cm thick) of stone for facing buildings and monuments, also referred to as cladding; also includes interior-exterior flooring. Interior flooring (tiling) is generally 7-12 mm thick.
Dimension Stone	A natural stone that has been quarried and shaped to certain dimensions for use in the building or monument industries.
Curbing Stone	Rectangular blocks, usually granite (about .15 X .45 X 2 m) used as curbing in road and bridge construction.
Flagstone	Stone which can be split into thin slabs (7 to 10 cm thick), used for sidewalks, patios, etc.
Granite	Any crystalline igneous rock. Light coloured rocks are generally termed granite

	and dark rocks (usually gabbro, diabase) are referred to as "black granite". These terms can include volcanic, silicious sedimentary, and metamorphic rocks as well as all plutonic rocks.
Landscaping Stone	Decorative rock including crushed, coloured stone, boulders and rough blocks used for sidewalks, driveways, borders, rock gardens.
Marble and Limestone	Marble is any carbonate rock that can be polished while limestone is a carbonate rock that cannot be polished well. The term marble also includes dark green serpentinites despite their meta-igneous formation.
Monumental Stone	All natural stone used for the manufacture of statues, tombstones, mausoleums and other monuments. The primary requirements are uniform texture and colour with a lack of flaws.
Ornamental Stone	Any attractive rock suitable for the manufacture of small objects such as ash-trays, bookends, etc. Rocks with flaws such as veins or inclusions which are not suitable for architectural or monumental stone may be marketable as ornamental stone.

Paving Stone	Rectangular, brick-sized blocks of roughly equal dimensions for sidewalks, driveways, and road construction.
Rubble	Randomly sized and shaped stone used for retaining walls, sea walls, fences, etc. These uses provide an economical way of disposing of quarry waste rock.
Structural Stone	Roughly rectangular blocks from less than a few tons to over 25 tons in weight. The primary requirement is high strength; colour and texture are secondary considerations.
Terrazzo Chips	Crushed stone, usually coloured marble or limestone, which is embedded in mortar and polished to form terrazzo floors.

THE BUILDING STONE MARKET

The potential for developing a dimension stone industry, in addition to requiring adequate reserves of suitable stone, is dependent upon the market - its size, location, and expectations in terms of commodity type, quality, and quantity. A prospective producer must study both the current and potential market conditions, considering that the market is, to a large extent, made by the producers. Demand for a product is dependent, in part, on its availability; a market can be created or expanded by the promotion of new stones and new commodities. For example, the province of Quebec uses 300,000 linear ft. of granite curbing per year, the new England States more than one million feet per year, yet Ontario uses none (Les Consultants Sogir, 1984). The reasons for this difference appear to be that the product is not available in Ontario and that Ontario civil engineers have not adequately studied the economic value of granite curbing. Ontario granite producers could create a local market by promoting and making granite available as an alternative curbing material, using the example of Quebec and New England to demonstrate the lower life cycle cost (inital, maintenance and replacement costs over a determined life cycle) of granite.

An analysis of market potential for various building stone commodities in eastern Ontario is beyond the scope of this study. However, a brief overview of recent market trends for the building stone industry in general is presented below.

Historic Trends

The building stone market in Canada was relatively stable through the late 1970's. In 1980-81, both volume and value of Canadian shipments of building stone began to increase (Table 1) but this growth was halted by the 1981-82 economic recession as commercial and residential construction activity decreased sharply. The market continued to slump through 1983 but began to recover in 1984 as a result of both increased construction activity and the trend toward greater use of natural stone in architectural designs. Market growth has continued through 1987 as illustrated by the rough stone import and export figures for Canada in Table 2.

TABLE 1. CANADA, TOTAL SHIPMENTS OF BUILDING STONE, 1979-1985

(Source: Canadian Minerals Yearbooks 1981 to 1987; Energy, Mines, and Resources Canada

BUILDING STONE	1979		1980		1981		1982		1983		1984		1985	
	(000t)	($000)	(000t)	($000)	(000t)	($000)	(000t)	($000)	(000t)	($000)	(000t)	($000)	(000t)	($000)
ROUGH	256	3.094	258	3,373	376	6,047	230	4,826	205	7.359	249	9.284	230	10.581
(% change from previous year)			+5	+25	+40	+56	-39	-20	-11	+52	+21	+26	-13	+14
MONUMENTAL AND ORNAMENTAL STONE	30	2.410	18	1.899	27	3.207	38	4.002	39	4,011	53	5.990	38	6,527
(% change from previous year)			-40	-21	+50	+69	+41	+25	+3	+0.2	+36	+49	-9	+9
OTHER (flagstone, curbstone, paving blocks, etc.)	35	1.703	40	1.585	33	1.134	26	1,027	19	900	17	937	25	1.367
(% change from previous year)			+14	-7	-17	-28	-21	-9	-30	-12	-10	+4	+47	+43
TOTAL	321	7.207	326	7,357	435	10,388	294	9.857	263	12.271	319	16.211	263	19.495
(% change from previous year)			+2	+2	+34	+41	-32	-5	-11	+24	-21	-31	-14	-14

TABLE 2. CANADA, ROUGH BUILDING STONE EXPORTS AND IMPORTS, 1985-87

(Source: Canadian Minerals Yearbook, 1987; Energy, Mines, and Resources Canada)

Exports	1985		1986		1987 (Jan.-Sept.	
Building Stone, Rough	(tonnes)	($000)	(tonnes)	($000)	(tonnes)	($000)
(% increase from	12.511	1.657	66.427	2.477	119.728	3.933
previous year)			+431	+49	+80	+59
Imports						
Building Stone, Rough	8.846	1.379	10.621	1.353	12.837	1.644
(% increase from previous year)			+20	+34	+21	-11

The market trend for building stone in general as described above reflects the trend for rough stone, which represents about 75 to 80 per cent of the building stone shipments. Demand for monumental stone, in contrast to that for rough stone, has increased each year since 1980 with the exception of 1983 in which very little change occurred. Other uses of stone show a steady decrease in demand until 1985 when a sharp reversal of the downward trend took place.

The United States market followed a similar trend. Both tonnage and value of dimension stone sold or used by producers declined sharply from 1981 to 1982 and recovered in 1984. Demand for finished marble was 72% higher in 1984 than in 1983; travertine imports were 133% higher, and granite imports 93% above the previous year's total (DPA Group Inc., 1987).

Market Outlook

The DPA Group Inc. (1987) report that "discussions with many architects and developers based in central Canada indicate that there is a definite resurgence in the use of natural stone," with the primary markets being Toronto, Ottawa and Montreal. The same report states that officials in the Building Stone Institute of America expect the next four years (1987-90) to be exceptional for stone use and that the Marble Institute of America reports "phenomenal growth" in the industry.

A 1986 survey of 1,000 U.S. architectural firms conducted by the Building Research Bureau also suggests a positive market outlook. Replies to the question of whether the use of natural stone in the firms buildings will increase, decrease or remain the same over the next five years are as follows (calculated from data in Dimensional Stone Magazine, July/August 1986):

	Remain the same	Increase moderately/greatly		Decrease moderately/greatly	
Granite	58.0%	32.5%	6.1%	2.7%	0.7%
Marble	58.0%	28.9%	7.5%	3.8%	1.8%
Limestone	72.8%	22.5%	2.0%	2.1%	0.6%

The increase in demand for stone from the commercial construction market applies to the residential market as well. New developments in stone processing technology have made possible the production of very thin, lightweight stone tiles (7mm marble for interiors; 1 cm granite and 2 cm marble for exteriors). These thin tiles require lighter, less expensive back-up walls, greatly reducing total construction and installation costs (Powell, 1986). New designs for residential buildings are incorporating stone tiles for their unique appearance in contrast to manufactured products, as well as for durability and easy maintenance (The DPA Group, Inc., 1987).

In summary, the growth of the building stone industry is expected to continue based on 1) the architectural trend toward greater use of stone for both aesthetic and structural reasons; 2) advances in stone cutting and processing technology which have made building stone a more competitively priced alternative to steel, concrete, glass and ceramics; and 3) improvements in construction techniques which have lowered installation costs.

BUILDING STONE DEPOSIT CRITERIA

The commodities of the building stone industry are produced from numerous rock types, each with a wide variety of qualities such as colour, texture and hardness. These properties, along with the extractable quarry block size, determine the potential uses of a body of rock with respect to building stone.

The criteria for deposits of various building stone commodities are discussed below.

Architectural and Monumental Stone

1. GRANITE

The criteria for granite architectural and monumental stone deposits, in approximate order of importance, are: a limited, regular jointing pattern; marketable colour and texture; low deleterious mineral content; and large deposit size. These are described in more detail below.

Fracture and Jointing determine the maximum size of blocks that can be quarried. Evaluation of the building stone potential of a granite body must include measurements of the attitude and spacing of major joint sets. The most desirable joint pattern consists of two subvertical, roughly orthogonal sets and a horizontal set, referred to as sheeting. A third subvertical set striking at an angle to the orthogonal set will make quarring difficult, as will joint sets dipping at less than 75 degrees or intersecting at less than 60 degrees. The minimum spacing required is about 2 m for vertical and 1 m for horizontal joints, as quarry blocks are generally at least 1 x 2 x 1.5 m in size.

Sheeting is the result of stress release due to erosional unloading. These joints usually become more widely spaced with depth, but zones of closely-spaced sheets (4 to 20 cm) can occur at depth; sheeting in anorthosites often increases with depth (Nantel, 1983). Granite bodies with no vertical joints frequently have close-spaced sheeting and vice-versa - a feature related to the dissipation of sheeting stress by movement on pre-existing primary joints (Hills, 1972). Many of the granite quarries in Vermont which produce architectural and monumental stone would not have been developed if not for the exploitation of well-sheeted cap rocks as rough building blocks in the early history of the area. Therefore, even a well-sheeted granite, if the vertical joint sets are satifactory, may warrant investigation at depth.

A more complete discussion of primary and secondary jointing was presented in OGS Open File Report 5556 (Verschuren et al 1985).

Colour and texture control the price and marketability of a stone, rather than its physical properties such as strength, porosity, etc. (Allison, 1984). In general, colour and texture of a granite must be consistent in order to fill large orders for stone. The distinction between uniform and consistent texture is important. Monumental granite generally requires an even, fine grain size while architectural granite can be less uniform in texture, exhibiting variable grain size or gneissic banding. The stone, therefore, must be either very uniform in texture or non-uniform in an interesting and consistent manner (Storey, 1986).

Textures that are generally considered as flaws, but may in some cases be desirable are: knots-dark masses of mafic minerals; lines -- any linear pattern formed by foliation, layering, flow-banding, etc.; variable grain size; pegmatite patches; quartz veins; and schlieren.

Colour is determined by mineralogy and grain size. Fine-grained rock is generally darker than a similar coarse-grained rock. Polishing also makes a rock appear darker. Mafic rocks which are dark green on a rough surface often appear black when polished. A good contrast between rough and polished surface colour is desirable in any granite that will receive cut or sandblasted lettering.

White, red, and black granites are the colours currently most in demand. Deep red shades result from high concentrations of hematite. Black granites (commonly gabbro, anorthosite, or diabase) command the highest price because a darker stone shows irregularities in colour and texture more readily than a lighter stone. The proportion of waste rock is therefore higher in a black granite quarry than in a light granite quarry. Waste in the Peribonca River anorthosites of Quebec can be as high as 90% (Nantel, 1983).

Other colours of granite may be marketable if quarried inexpensively and offered at a competitive price. Domestic replacements for high-priced imports should be pursued, but not to the extent that other granites are excluded as exploration targets.

Deleterious minerals include any mineral that breaks down rapidly due to weathering. Sulphides should be absent or present only in trace amounts. Soft ferromagnesian minerals and altered feldspars weather easily and will not sustain a polish. Excessive biotite (greater than 5%) can cause plucking during polishing, and garnet and corundum can cause polishing problems because of their hardness. Magnetite and ilmenite are common in granites, but are resistant to weathering and are generally acceptable.

Deposit size should be sufficient to quarry for at least 20 years. A minimum size is about 1 square kilometer (Storey, 1986), but may be smaller for good quality stone being produced for local markets.

2. MARBLE AND LIMESTONE

The same general criteria used to evaluate granite deposits apply to marble and limestone. Several problems related specifically to Eastern Ontario marbles are discussed below.

Joint patterns must allow extraction of large blocks (at least 3 cubic meters), as for granite quarrying.

A very wide range of colours and textures are marketed, most being produced in Italy and several other European countries. European marbles were formed by very low grade metamorphism of thickly bedded (1-2 m), extremely pure limestones. Eastern

Ontario marbles were formed by low to high grade metamorphism (greenschist to granulite facies) of thinly-bedded (0.2-5 cm) impure limestone and dolostone (Verschuren et al 1985). For this reason, eastern Ontario marbles cannot be expected to duplicate the qualitites of European marbles, but must be promoted and marketed for their own unique colours and textural patterns.

Within areas of low grade metamorphism, thin bedding and intense folding result in planes of weakness and inconsistent colour/texture patterns. Recrystallization at higher grades of metamorphism increases strength along bedding planes and can obliterate primary banding, but weakens bonds between individual grains. This can cause plucking of grains during polishing.

Higher grade metamorphism of impure, silicious limestone or dolomite produces medium to coarse grained marbles containing calc-silicate and magnesium-silicate minerals such as talc, tremolite, forsterite, diopside, periclase, wollastonite, serpentine, etc. This can result in attractive colour/texture patterns, but the stone may require granite rather than marble processing equipment because of the silicate mineral content. Similar rocks often result from metasomatic alteration of marbles along fault zones or at intrusive rock contacts.

Dolomitic marble under low grade metamorphic conditions deforms in a brittle manner, while calcitic marbles undergo plastic deformation. This usually precludes the extraction of large quarry blocks from low-grade dolomitic marble, but healing of fractures by late carbonate or silicate material can produce an attractive stone with good quarry block size potential. Iron-bearing carbonates within the marble or veins may weather to a rusty brown colour, making the stone unsuitable for architectural or monumental purposes.

Limestone is not generally used as architectural or monumental stone because, in the building stone definition, limestone does not polish well. However, some true limestones are marketed as marbles. They are usually fine grained, dark coloured, and thickly bedded.

In general, eastern Ontario marbles are characterized by larger grain size and more variable texture than European marbles. However, a sufficiently large deposit of consistent texture could, if well-promoted, provide a domestic alternative to more costly, imported marble.

Curbing and Structural Stone

Curbstone can be produced from granite, sandstone, or limestone, but granite is the dominant type. The granite body must be jointed in a way that allows the rock to be split into long, rectangular sections.

Colour and texture are of less importance. A recent report published by the Ontario Ministry of Transportation and Communications (Rogers, 1985) encourages the use of granite curbing in highway construction in Ontario. Locally produced granite curbstone can be installed at a total cost comparable with that of less durable poured-in concrete curbing (Les

Consultants Sogir Inc., 1984).

Structural stone primarily requires high strength and a joint pattern suitable for extraction of blocks from a few tons to 25 tons in weight. Colour and texture are secondary considerations. Granite is the most commonly used structural stone, but limestone is also an excellent material for structural applications.

Stone For Other Uses

Other uses of stone include ashlar, paving stone, flagstone, landscaping stone, rubble, crushed stone, terrazzo chips, and ornamental stone. The required characteristics of stone for these uses, as implied by the commodity definitions, vary greatly, from ease of splitting (paving and flagstone) to variable colour (terrazzo chips and ornamental stone). Virtually any rock is suitable for at least one of these uses, but the combination of low price and/or low demand generally precludes the opening of a quarry solely for the production of one of these commodities, many of which can be produced from the waste rock of a dimension stone quarry.

Quarry Economics

Most quarries are not suited to the exclusive production of large blocks due to local irregularities in joint pattern or intensity, colour, or texture. The current increasing demand for large panels of architectural stone, requiring large quarry blocks, has led to high-grading, or selective quarrying which involves a higher quarry cost than total extraction. However, total extraction requires a market for rough stone, rubble, ashlar, etc. to be economically viable. This is an important factor in assessing the potential of a stone deposit. A low degree of variation in jointing, colour, and texture is more critical in a market where only a small range of products is sold than in a market where a complete range of products, from architectural stone to rubble, is in demand (Meade, 1986).

Any property with potential for the production of architectural and monumental stone should also be considered as a potential source of structural stone, curbstone, ashlar, crushed stone, etc. The entire range of products should be strongly promoted in order to achieve a quarry operation based on total extraction with a low proportion of waste rock rather than on the less cost-efficient process of selective extraction.

ASTM Tests

Building stone products must meet specific physical property requirements. These specifications and tests have been developed by the American Society for Testing and Materials (ASTM). Procedures for the tests listed in table 3 are available from the Society (1916 Race Street, Philadelphia, PA 19103, USA).

Table 3: **ASTM SPECIFICATIONS FOR BUILDING STONE**

C97-83	Absorption and bulk specific gravity
C99-52	Modulus of rupture
C119-83C	Standard definitions of terms
C120-52	Flexure testing of slate
C121-48	Water absorption of slate
C131-55	Abrasion resistance by Los Angeles Test
C170-50	Comprssive strength
C217-58	Weather resistance of natural slate
C218-48T	Combined effort of temperature cycles and wash salt solutions on natural building stones
C241-51	Abrasion resistance of stone subjected to foot traffic
C406-84	Roofing slate
C503-79	Exterior marble
C543-81	Slate blackboards
C568-79	Dimension limestone
C615-80	Granite Building Stone

Part III

BUILDING STONE POTENTIAL IN EASTERN ONTARIO

CURRENT PRODUCERS

There are currently twelve companies producing building stone products in eastern Ontario. The commodities produced include monumental and architectural stone, flagstone, ashlar, terrazzo chips, and decorative aggregate. Table 4 lists the companies and products; figure 3 shows quarry and plant locations.

Other major producers in Ontario include Arriscraft Corp. of Cambridge with dolomitic limestone (marketed as marble) quarries in the Bruce Peninsula and Nelson Granite with granite quarries in Vermilion Bay near Kenora.

There are numerous past producing quarries and test quarries of granite, marble and limestone throughout eastern Ontario, many of which are described in the 1985 and 1986 property examination reports.

RESULTS OF 1985-86 RECONNAISSANCE SURVEY

Data from field work were recorded on data forms and are presented in property examination reports with location maps and photographs. Reports for properties examined in 1985 have been published in OGS Open File Report 5585 (Verschuren et al, 1986 and are not reproduced in this report. However, a table summarizing the features of the 1985 properties with moderate to good building stone potential is included in Appendix 1.

Appendix 2 contains reports on all properties examined in 1986.

TABLE 4: EASTERN ONTARIO BUILDING STONE PRODUCERS
(from Kingston et al, 1988)

Map Location No.	Company		Township	Rock Type	Commodity	Property Report No. (appendix 1)
1	Canada Talc Industries Ltd.	Henderson & Conley Mines	Huntingdon	Marble	Dolomitic marble terrazzo chips are produced from this talc mine	
2	Central Ontario Natural Stone		Somerville	Stone	Flagstone	
3	Cornwall Sand and Gravel		Cornwall	Limestone	Limestone blocks for dimension stone are produced from thick upper beds of this crushed stone quarry	
4	Fairmont Granite Ltd. and Granicor	Battersea Granite Quarry	Storrington	Granite	Granite blocks for dimesion stone. Blocks are processed at Beebe, Quebec	STO-01
5	Granimar Resources	Straw Hill Quarry	Rear of Leeds and Lansdowne	Granite	Granite waste from former dimension stone producer is used to produce decorative aggregate	RLL-01
6	Karnak Marble Quarries Ltd.		Cornwall	Dimension Stone	This high technology dimension stone finishing plant produces tiles and panels of marble and granite purchased from quarries in Quebec, Ontario, and the U.S.	
7	MacDonald		Lutterworth	Stone	Flagstone	
8	Orzell Sand and Gravel		Harvey	Limestone	Flagstone is produced from this limestone aggregate quarry	
9	Sloan, N.	Sloan Quarry	Storrington	Sandstone	Sandstone building blocks (ashlar)	
10	Stoklosar Marble Quarries Ltd.		Madoc	Marble	Marble chips (terrazzo)	MAD-01 MAD-04
11	W.R. Barnes Company Limited		Rear of Leeds and Lansdowne	Granite	Decorative aggregate is produced from former dimension stone quarry	RLL-02
12	Windover, N.		Harvey	Limestone	Flagstone	

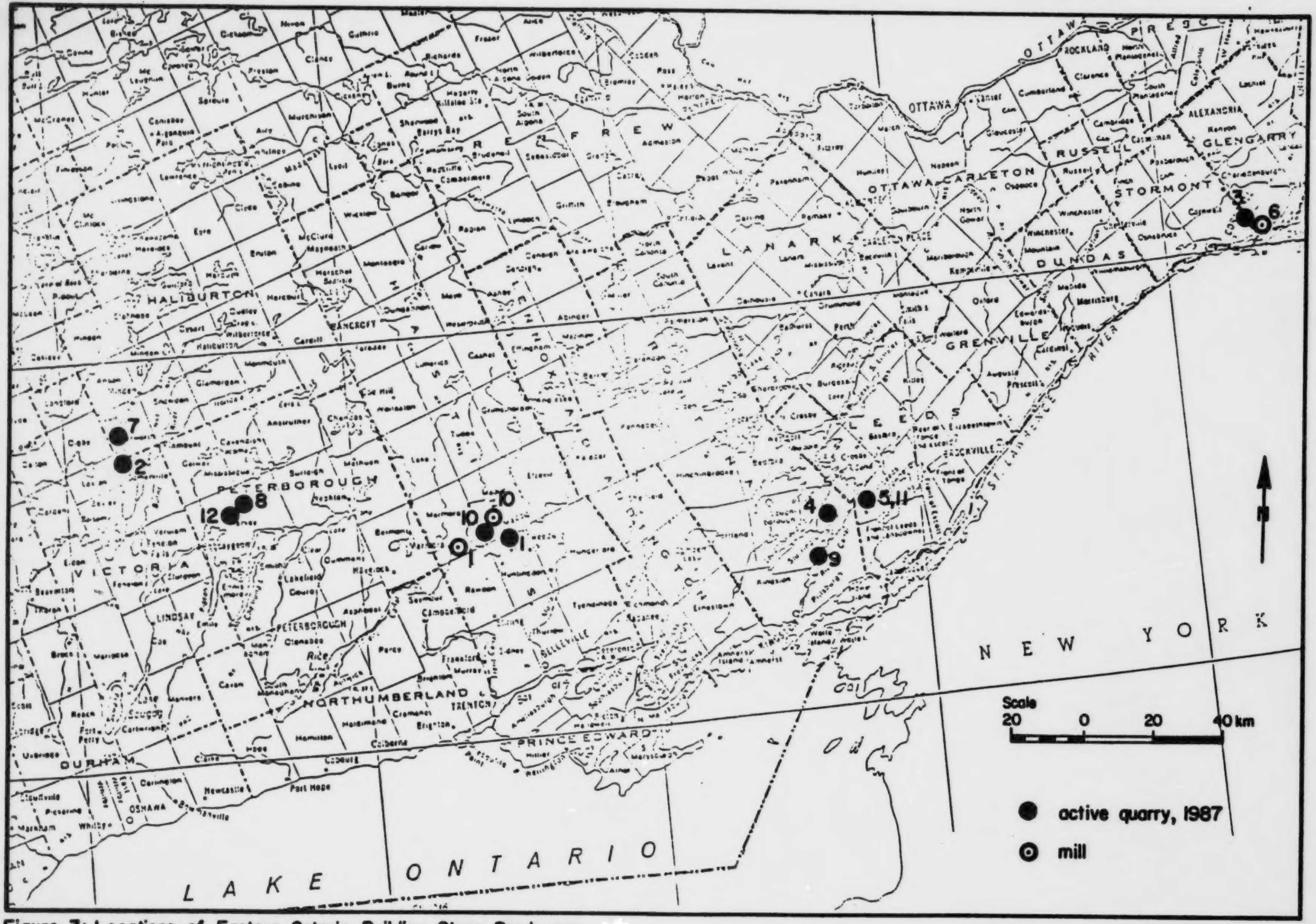

OTTAWA
RIVER
OTTAWA
OTTAWA-CARLETON
RUSSELL
GLENGARRY
STORMONT
DUNDAS
ALEXANDRIA
ROCKLAND
LANARK
GRENVILLE
LEEDS
BROCKVILLE
ST. LAWRENCE
RENFREW
HALIBURTON
BANCROFT
PETERBOROUGH
VICTORIA
LINDSAY
NORTHUMBERLAND
TRENTON
BELLEVILLE
PRINCE EDWARD
DURHAM
OSHAWA
LAKE ONTARIO
NEW YORK
N
Scale
20
0
20
40 km
1
2
3
4
5,11
6
7
8
9
10
12
active quarry, 1987
mill

Figure 3: Locations of Eastern Ontario Building Stone Producers

All properties have been catergorized as having good, moderate or poor potential for quarry block size - the most important factor in evaluating a building stone prospect. Property evaluations are discussed below under the following headings:

1) Ontario Gneiss Segment

2) Central Metasedimentary Belt - Granite
Marble

3) St. Lawrence Platform - Paleozic Rocks

All properties are designated by year-township-site number, for example 86-KAL-004 (1986, Kaladar Twp., site number 4)

Data Forms

The data forms used in the property examination reports include self-explanatory terms such as colour, grain size, texture, fabric, ect., but also contain some terms which require further definition:

Jointing

Regular Pattern - a pattern of one or more joint sets, recurring joint planes of relatively uniform strike and dip. Orthogonal jointing is a regular pattern composed of two joint sets at about 90 degrees.

Irregular Pattern - randomly oriented joint planes, often discontinuous or curved.

Limited Jointing: average spacing >1.5 m.
Moderate Jointing: average spacing 0.5 - 1.5 m.
Intensive Jointing: average spacing <0.5 m.

Orientations of dominant joint sets were recorded where possible, except where the rocks showed irregular, intensive jointing.

Potential for Quarry Blocks

The potential quarry block size depends on the nature and intensity of the joint patern as follows:

Joint Pattern	Quarry Block Potential
Regular, Limited	Good
Regular, Moderate	Moderate
Regular, Intensive	Poor
Irregular	Poor

Possible Uses

In general, the possible uses are determined by potential quarry block size. Texture, colour and deleterious mineral content may also limit the possible uses of a stone. Rock with good quarry block potential is usually considered as possible architectural and monumental stone. Monumental stone may also be produced from a rock with moderate quarry block potential. Rock with poor quarry block potential has possible uses as ashlar, curbing stone, paving stone, flagstone, ormanental stone, landscaping stone, and rubble, all of which can also be produced from waste rock of an architectural/monumental stone quarry.

Use of Explosives

Previous use of explosives may have produced serious fracturing which can affect future quarring. High velocity explosives used to construct highway roadcuts produce intense fracturing. Low velocity explosives such as "black powder" are generally less damaging and are commoly used in building stone quarries (Verschuren et al, 1986). Local fracturing due to explosives can lead to underestimation of potential quarry block size of a building stone prospect.

Ontario Gneiss Segment

All of the 19 building stone prospects examined in the Ontario Gneiss Segment are granites. Four areas having moderate to good building stone potential are recommended for further investigation and are described as follows (Verschuren et al, 1986):

North Bay-Powassan Area

Two properties in South Himsworth township within the granitic to monzonitic Powassan Batholith display limited jointing with massive texture and marketable colours (SHIM-01, 02). A third property in Strong township (STR-01) is a moderately jointed, grey, porphyritic monzonite, possibly the southern extension of the Powassan Batholith. The entire Powassan Batholith particularly the more massive interior, is strongly recommended for further exploration.

Noelville-Burwash Area

The Cosby Batholith (85-COS-01) is a moderately jointed, dark pink to brown, monzonitic intrusion. The margins are intensely deformed and gneissic, but the interior is massive to weakly foliated and shows good building stone potential.

Bracebridge-Port Carling Area

A garnet-biotite-quartz-feldspar qneiss exposed on Highway 118 west of Bracebridge shows regular jointing which is variable but locally limited in intensity (86-MUS-02). About 6 km west of 85-MUS-02, massive to weakly foliated monzonite is exposed along Highway 118 at Brandy Lake. Further investigation of both rock types is recommended.

Baxter Township

Properties 85-BAX-01 and 03 west of Port Severn are granitic gneiss with regular, limited joint patterns. Mineralogical and textural inconsistencies may limit the potential use of the stone to structural applications. However, the high potential for large quarry blocks in the area suggests that further exploration is warranted.

Several other areas recommended for exploration based on a study of geologic reports are described in OGS Open File Report 5585 (Verschuren et al, 1986). Additional work on building stone potential in the Ontario Gneiss Segment is currently being conducted by the Ministry of Northern Development and Mines, Dorset (Marmont and Johnston, 1987).

Central Metasedimentary Belt

GRANITE

A total of 187 granite prospects were examined in the Central Metasedimentary Belt, 35 in 1985 and 152 in 1986. A table of the properties and their building stone potential is included in

Appendix 3, listed alphabetically by pluton name, followed by the remaining properties (in un-named plutons or non-plutonic rocks) listed alphabetically by township. The 1986 property examination reports (Appendix 2) are arranged in the same order and include a summary report on each pluton. Figure 4 shows the locations of the plutons exaimined in 1985 and 1986, listed in table 5.

Table 6 lists the granite prospects considered to have moderate to good potential for building stone development. It should be noted that the potential of the examination site does not necessarily reflect the potential of the intrusion as a whole. Because of time constraints and the reconnaissance nature of the survey, ease of access was an important factor in locating examination sites, therefore some intrusuions in which poor potential was observed may show higher potential in other parts of the intrusion. However, on a reconnaissance scale, the properties and plutons listed in table 6 represent areas of least intense jointing, therefore highest building stone potential. These properties and plutons, shown in Fig. 5, can be broadly grouped into five areas based on geological subdivisions of the Central Metasedimentary Belt of Wynne-Edwards (1972) as follows:

1. Frontenac Axis East - Battersea, Gananoque, La Rose Bay, Lyndhurst and Taylor plutons
2. Frontenac Axis West - McLean pluton
3. Hastings Basin Central - Deloro, Elzevir, Mount Moriah and Northbrook plutons; 85-KAL-01, 86-KAL-009, and 85-OLD-25
4. Hastings Basin West - Coe Hill pluton and 85-BUR-01
5. Glamorgan-Cardiff Belt - Gooderham and Mallard Lake plutons; 85-CARL-01 and 85-RAG-01

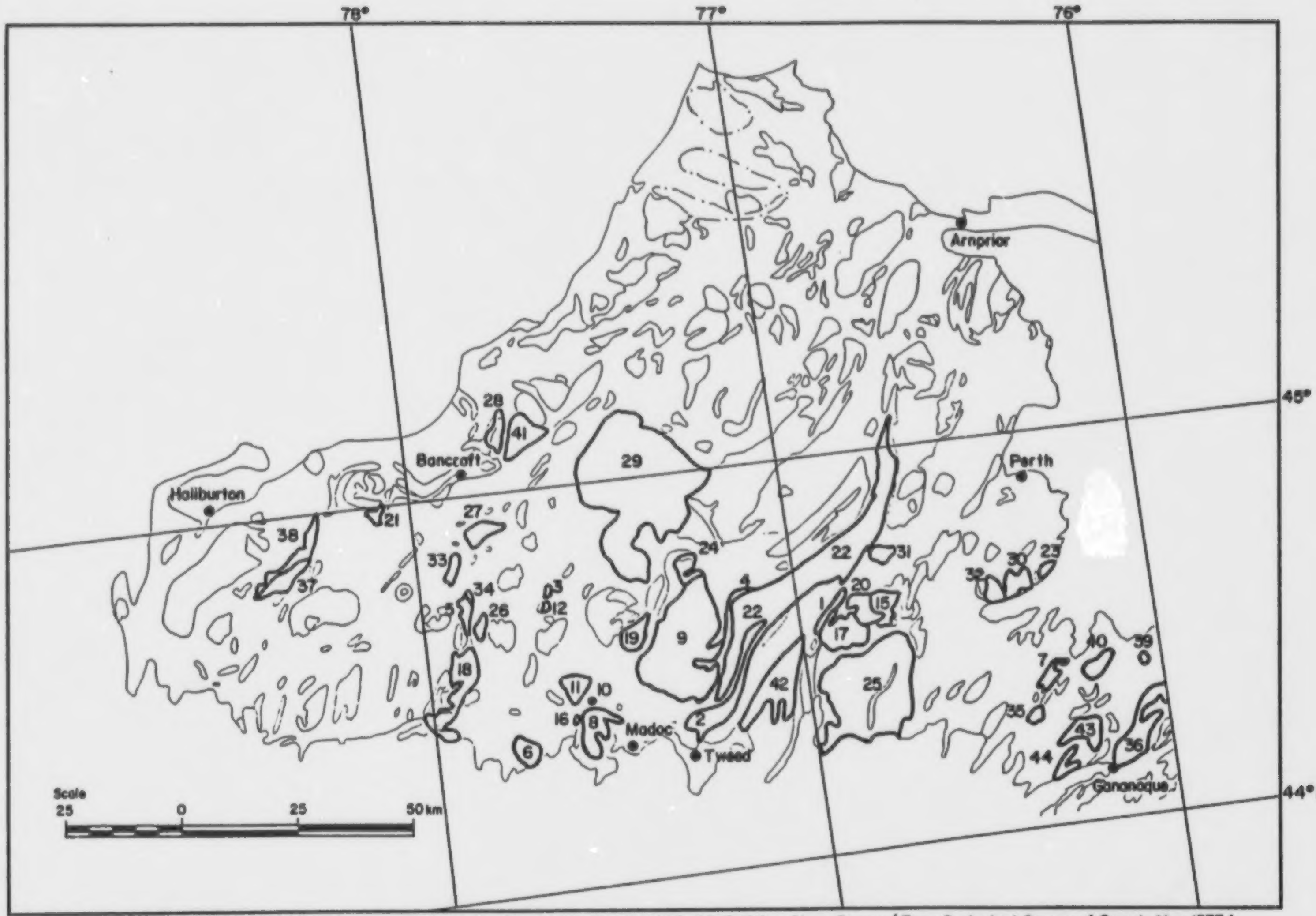
Table 5: Plutons Examined in 1985-86 Building Stone Survey

1986

Pluton No.	Name
1	Abbotts Hill
2	Addington
3	Beaver Creek
4	Bishop Corners (Formation)
5	Coe Hill
6	Cordova
7	Crow Lake
8	Deloro
9	Elzevir
10	Empey
11	Gawley Creek
12	Glanmire
13	Lanark - Oso
14	Lavant
15	Leggat Lake
16	Malone
17	McLean
18	Methuen and Belmont
19	Mount Moriah
20	Mountain Grove
21	Newboro
22	Northbrook
23	Rideau Lake
24	Skootamatta Lake
25	Tamworth, Bellrock, Wilkinson, First Depot
26	The Ridge
27	Umfraville
28	Wadsworth
29	Weslemkoon
30	Westport
31	White Lake
32	Wolfe Lake
33	Wollaston Granite
34	Wollaston Lake Gabbro

1985

Pluton No.	Name
35	Battersea
36	Gananoque
37	Glamorgan
38	Gooderham
39	La Rose Bay
40	Lyndhurst
41	Mallard Lake
42	Sheffield
43	Taylor
44	Pittsburg


78°
77°
76°
45°
44°15'
Arnprior
Perth
Bancroft
Haliburton
Madoc
Tweed
Gananoque
Scale
25
0
25
50 km
1
2
3
4
5
6
7
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11
12
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Figure 4 : Pluton Map of the Central Metasedimentary Belt showing Plutons examined in 1985-86 Building Stone Survey. (From Geological Survey of Canada Map 1533A - Plutonic Rocks in Ontario).

Table 6: Granite Prospects With Moderate to Good Building Stone Potential, Central Metasedimentary Belt

Pluton Name	Township	Property Report	Potential Moderate (M) Good (G)
Battersea	Storrington	85-STO-01*	G (active quarry)
Batterse	Storrington	85-STO-02	M-G
Coe Hill	Wollaston	85-WOL-01*	M
Coe Hill	Wollaston	86-WOL-007*	M
Coe Hill	Wollaston	86-WOL-008*	M
Coe Hill	Wollaston	86-WOL-010	M
Deloro	Marmora	86-MAR-007	M-G
Deloro	Marmora	86-MAR-008	G
Deloro	Marmora	86-MAR-009	M
Deloro	Marmora	86-MAR-010	M-G
Deloro	Marmora	86-MAR-011	M
Deloro	Marmora	86-MAR-013	M
Deloro	Madoc	86-MAD-013	M
Elzevir	Elzevir	86-ELZ-004	M
Gananoque	Front of Leeds and Lansdowne	85-FLL-04*	M
Gooderham	Monmouth	85-MON-01	G
La Rose Bay	Rear of Leeds and Lansdowne	85-RLL-04	M-G
Lyndhurst	Rear of Leeds and Lansdowne	85-RLL-01*	G (active quarry)
Lyndhurst	Rear of Leeds and Lansdowne	85-RLL-06	G
Lyndhurst	Rear of Leeds and Lansdowne	85-RLL-07	G
Lyndhurst	Rear of Leeds and Lansdowne	85-RLL-08	G
Mallard Lake	Dungannon	85-DUN-06b	M
McLean	Olden	86-OLD-020	M
McLean	Olden	86-OLD-022	M
Mount Moriah	Grimsthorpe	86-GRI-005	G
Northbrook	Kennebec	86-KEN-004	M
Taylor	Front of Leeds and Lansdowne	85-FLL-01*	G
Taylor	Front of Leeds and Lansdowne	85-FLL-02*	G
	Burleigh	85-BUR--01	G
	Carlow	85-CARL-01	M-G
	Kaladar	85-KAL-01*	M-G
	Kaladar	86-KAL-009	M
	Olden	86-OLD-025	G
	Raglan	85-RAG-01	G

* former producing quarry

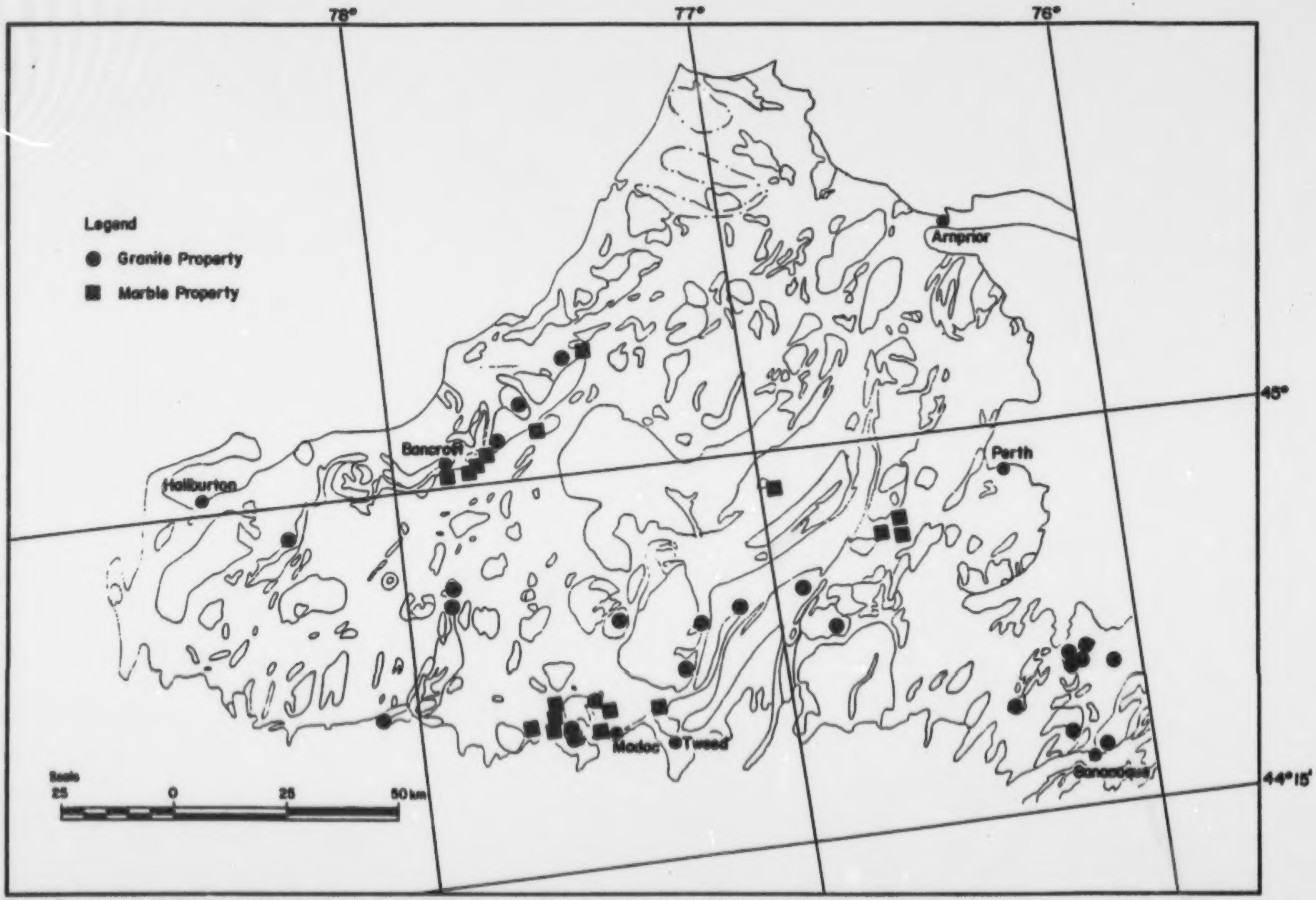
78°
77°
76°
45°
44°15'
Legend
● Granite Property
■ Marble Property
Haliburton
Bancroft
Arnprior
Perth
Madoc
Tweed
Gananoque
Scale
25
0
25
50 km

Figure 5: Locations of Granite and Marble Properties with Moderate to Good Building Stone Potential, Central Metasedimentary Belt.

Brief evaluations of the above areas are given below.

Frontenac Axis East

This high-grade (granulite facies) metamorphic region has the highest building stone potential within the study area. The high metamorphic grade reflects temperature and pressure conditions which may have produced partial or complete melting of the rocks, allowing plutonic rocks to intrude with minimal resistance. Thus, the late tectonic intrusions were not highly stressed and have relatively limited joint paterns. The majority of Quebec granite quarries are also within areas of granulite facies metamorphism, suggesting that intrusions and gneisses within high grade metamorphic regions are primary targets for granite dimension stone.

The Frontenac Axis north of Kingston and Gananoque hosts numerous former producers and test quarries as well as the only current producer of dimension granite in eastern Ontario (Battersea quarry, Fairmont Granite Ltd.).

Frontenac Axis West

Three dome-shaped intrusions - the McLean, Mountain Grove and Leggat Lake plutons - lie within this area just east of the boundary between the Hastings Basin and the Frontenac Axis. The metamorphic grade in the area is lower than that in the Frontenac Axis East area. Wolff (1982) suggests that the intrusions are late tectonic in a high temperature regime of medium-grade metamorphism. The Mountain Grove mafic intrusion is the oldest of the three and is the most intensely jointed, showing poor building stone potential. The McLean and Leggat Lake granite plutons represent later stage intrusions possibly resulting from partial melting of the crust (Wolff, 1982) and are less intensely jointed. The McLean Pluton appears to have good building stone potential, particularly toward the interior. The Leggat Lake pluton, though more strongly jointed, also warrants further investigation.

Hastings Basin Central

The central part of the Hastings Basin, including the Deloro, Mount Moriah, Elzevir and Northbrook plutons, represents the lowest metamorphic grade in the Central Metasedimentary Belt. The regional greenschist facies metamorphism has had little effect on the Deloro and Mount Moriah plutons, which are quite massive and equigranular. The larger Elzevir and Northbrook plutons are locally sheared and gneissic, but the reconnaissance survey indicates that massive, homogenous zones suitable for building stone are present.

While deformation in areas of high metamorphic grade occurs continuously by ductile movement and recrystallization, the cooler, less ductile rocks of the Hastings Basin exhibit less recrystallization and more brittle deformation such as faulting and shearing (Wynne-Edwards, 1972). It appears that the Deloro and Mount Moriah plutons are relatively unaffected by the regional metamorphism because the deformation took place in less competent metavolcanics and metasediments surrounding the plutons. For the same reason, smaller plutons or areas of volcanic rock within pressure shadows of intrusions may have building stone potential (85-OLD-25 and 85-KAL-01).

Hastings Basin West

The Coe Hill granite is a late tectonic mesozonal intrusion in a zone of amphibolite grade metamorphism. The main fold axes in the area are northeast-southwest, but there is also strongly developed northwest-southeast crossfolding (Hewitt, 1962). The complex structure may have produced the generally irregular joint patterns seen in the intrusive rocks of the area. The Coe Hill granite hosts two former producers of granite dimension stone which had problems caused by irregular jointing, but the blocks were of a size suitable for monumental stone. Further exploration within the Coe Hill granite is warranted.

The Belmont granite in northwestern Belmont township hosts a formerly producing quarry which was abandoned due to sheeting problems. However, the massive texture and limited vertical jointing suggest that further exploration in the Belmont granite is warranted.

Glamorgan-Cardiff Belt

The Glamorgan-Cardiff belt of gneiss domes and associated plutons lies along the northwestern margin of the Central Metasedimentary Belt in a zone of amphibolite facies metamorphism. The gneisses are similar to those in the Ontario Gneiss Segment and may represent remobilized basement material (Wynne-Edwards, 1972).

The Mallard Lake gabbro is predominantly coarse-grained hornblende-plagioclase gneiss but is locally a fresh-looking, massive quartz diorite (Hewitt and James, 1956). The Gooderham granite hosts a former producer of monumental and paving stone. The lack of intense jointing at several sites in this belt may be related to the presence of marbles interlayered with gneisses and intrusions. The marble belts are considered by Culshaw (1986) to be zones of intense ductile shear. This deformation may have released a large part of the strain energy, leaving the more competent plutonic rocks relatively unaffected by the deformational stress. Properties 85-MCN-01, and 85-RAG-01 have very good quarry block size potential, indicating that additional exploration in this area is warranted.

MARBLE

Table 7 lists the property reports and quarry block potential for marble prospects examined during the 1985-86 building stone survey. The 1986 property reports are included in Appendix 2; 1985 reports are published in OGS Open File Report 5585 (Verschuren et al, 1986) and are summarized in Appendix 1 of this report.

The quarry block potential indicates only the potential for use as architectural or structural stone. Properties with poor quarry block potential may be of interest as sources of crushed stone for landscaping or terrazzo, depending on their colour and texture. Stoklosar Marble Quarries Ltd. currently operates several small quarries in the Madoc area to obtain a variety of coloured marbles for terrazzo chips.

Marble prospects with moderate to good quarry block potential, shown in Fig. 5, are concentrated in three areas: the townships of Madoc-Marmora, Oso, and Dungannon-Mayo. Because of the small number of properties examined, many of which are formerly producing quarries, these areas may represent only a small portion of the Central Metasedimentary Belt with potential for marble building stone development. Properties in Raglan and Clarendon townships, areas with no production history, show good potential for large quarry blocks, therefore other marble-rich areas in addition to those described below should be examined for building stone potential. The distribution of marble belts in eastern Ontario is shown in Figure 6.

TABLE 7: Marble Prospects Examined, 1985-86 Building Stone Survey

Township	Property Report	Quarry Block Size Potential Poor (P) Moderate (M) Good (G)
Clarendon	86-CLA-001	G
Darling	85-DAR-01*	P-M
Dungannon	85-DUN-01*	M
	-02*	G
	-05	P
	-06	M
	-06c	P
	86-DUN-001	P
Faraday	86-FAR-020*	M
	-021*	M
Hungerford	85-HUG-02*	M-G
Huntingdon	85-HUN-04	G (active-terrazzo)
Kennebec	86-KEN-030	P-M
Madoc	85-MAD-01	P (active-terrazzo)
	-04*	P
	86-MAD-030	M
Marmora	85-MAR-02	G
	-03*	G
	-04*	M-G
	86-MAR-020*	P
Mayo	85-MAY-02	M
Olden	86-OLD-026	P
Oso	86-OSO-010	M
	-011	M
	-012*	M
Raglan	85-RAG-02	M-G
Ross	86-ROSS-001	P-M
Somerville	85-NOR-01	P

* former producing quarry

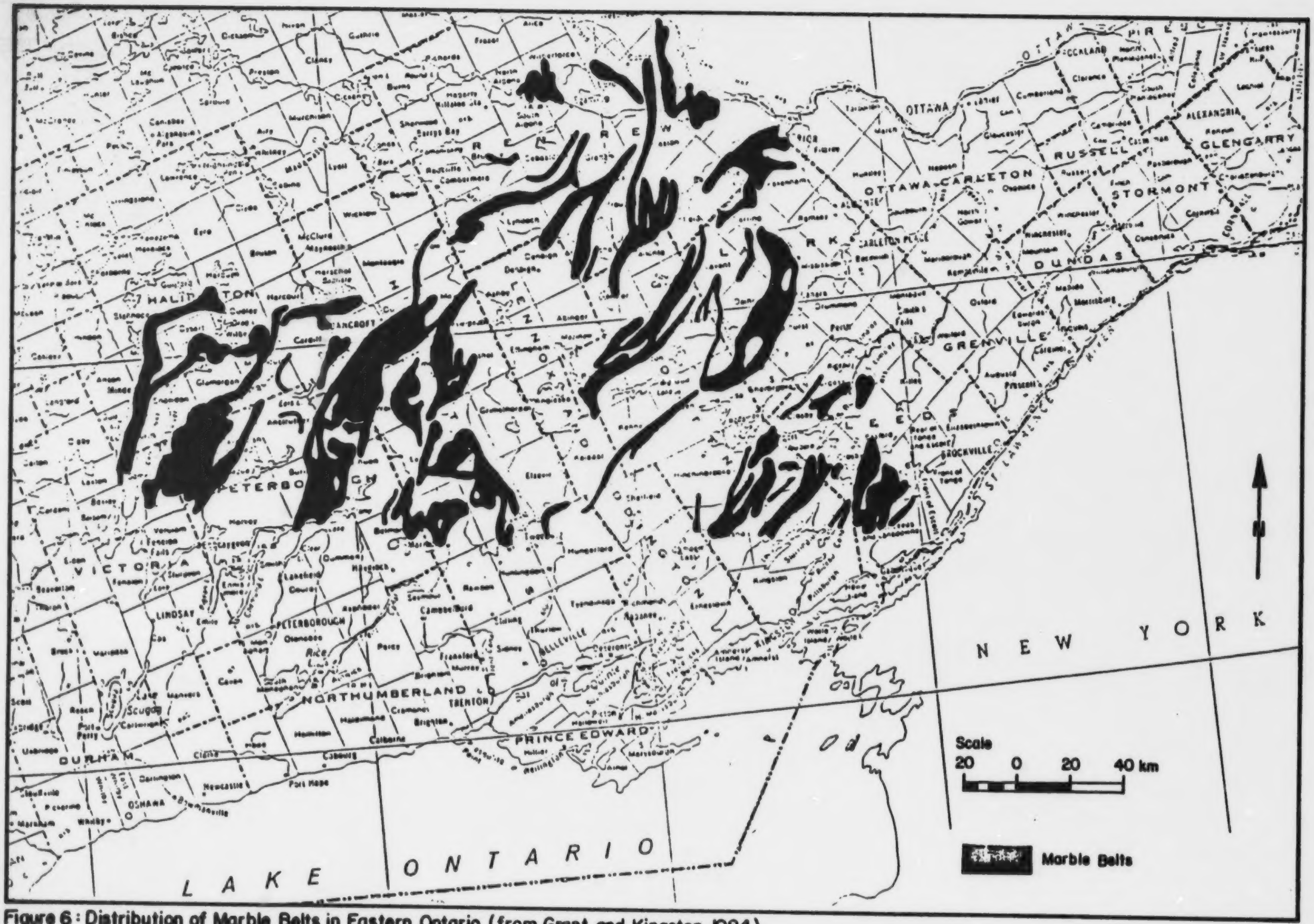
OTTAWA
OTTAWA-CARLETON
RUSSELL
GLENGARRY
STORMONT
DUNDAS
GRENVILLE
LEEDS
BROCKVILLE
CARLETON PLACE
LANARK
RENFREW
FRONTENAC
LENNOX AND ADDINGTON
HASTINGS
BANCROFT
HALIBURTON
PETERBOROUGH
VICTORIA
LINDSAY
NORTHUMBERLAND
TRENTON
BELLEVILLE
PRINCE EDWARD
DURHAM
OSHAWA
Scugog
Rice L.
Kingston
ST LAWRENCE RIVER
NEW YORK
LAKE ONTARIO
N
Scale
20 0 20 40 km
Marble Belts

Figure 6: Distribution of Marble Belts in Eastern Ontario (from Grant and Kingston, 1984).

Madoc-Marmora Area

Metasomatic alteration of calcitic marbles surrounding the Deloro pluton has produced a wide range of colours including white, pink, green, blue-grey, and black. These are currently quarried only for terrazzo chips, but several sites appear suitable for the production of large quarry blocks.

Oso Township

Pale grey to white, calcitic and dolomitic marbles in this area show moderate quarry block size potential. One quarry has produced an attractive banded marble on a small scale. Further investigation of the Oso township area is warranted.

Dungannon-Mayo Area

Dolomitic marbles of various colours and textures have been quarried in this area. Some of this stone (85-DUN-01 and 02) was used as interior decorative stone in the parliament buildings in Ottawa. Colours include white, green, brown, grey, and blue in massive, banded, and brecciated textures.

Clarendon Township

Property 86-CLA-001 shows very good building stone potential in terms of both quarry block size and aesthetic appeal. It is a white and pale-brown banded to fragmental calcitic marble from which a banded or mottled appearance can be obtained, depending on the direction of the cut. Further investigation of this site and of the Clarendon area marbles in general is warranted.

Hungerford Township

The Tweed Marble Quarry (85-HUG-02), operated in the 1960's by the Vermont Marble Company, produced four varieties of marble for architectural uses. White-grey to pale green dolomitic marble of massive, nodular, and weakly banded textures was extracted in blocks ranging from 5 to 15 tons. The quarry appears to have potential for further production, and additional exploration in the area is warranted.

Raglan Township

White to pale blue-grey, coarse-grained, calcitic marble (85-RAG-02) shows moderate quarry block size potential. Further examination of the area is recommended.

St. Lawrence Platform-Paleozoic Rocks

Limestone properties examined during this study are listed and rated for potential quarry block size in Table 8. These properties, in Paleozoic rocks of the Bobcaygeon and Gull River formations, are all located at formerly or currently producing quarries. Some limestones can be classified as commercial marbles depending on their ability to take and sustain a polish. Three samples of Bobcaygeon Formation limestone polished for this study do not polish sufficiently well to be classified as commercial marble due to irregular, soft, shaly partings. The limestone does, however, have potential as structural building stone, ashlar, flagstone, terrazzo chips, and crushed stone, all of which have been produced from quarries within Gull River and Bobcaygeon formation limestones.

TABLE 8: Limestone Prospects Examined, 1985-86 Building Stone Survey

Township	Property Report	Quarry Block Size Potential Poor (P) Moderate (M) Good (G)
Huntingdon	85-HUN-01	G
	-02	G
	-03	M-G
Madoc	85-MAD-02	M
	-03	M
	-05	P
	-07	P
Marmora	85-MAR-01	M
Pakenham	85-PAK-01	M-G
Thurlow	86-THUR-001	P (active-aggregate)

Note: 1985 property reports are summarized in Appendix 1. Complete reports are available in OGS Open File Report 5585 (Verschuren et al, 1986).

East of the study area, Bobcaygeon Formation limestone is being quarried as commercial marble. Karnuk Marble Quarries Ltd. of Cornwall produces a black marble tile from dark grey limestone quarried in Cornwall township. This product is being successfully marketed as a domestic replacement of black marble imported from Spain (Michael DiGirolamo, Manager, Karnuk Marble Quarries Ltd.; March 1988, personal communication).

Other Paleozoic rocks within the study area which have been quarried for building stone include thickly bedded dolostone of the Oxford Formation (Beekmantown Group) and Nepean or Potsdam Formation sandstone. Oxford Formation dolostone exposed east of the Frontenac Axis has been used as rough building stone and aggregate. Ashlar is produced from sandstone at the Sloan Quarry in Storrington township at the Western margin of the Frontenac Axis (Hewitt, 1972).

Figure 7 shows the Paleozoic stratigraphy within the study area and Figure 8 shows the distribution of these formations. Based on the requirements of thick bedding and lack of shaly partings, the formations with best potential for development as structural building stone or commercial marble are the limestones of the lower Bobcaygeon Formation and the dolostones of the Oxford Formation.

Results of ASTM Tests

A total of 6 granite and 3 marble samples were submitted to ASTM tests to determine whether the rocks meet ASTM specifications for

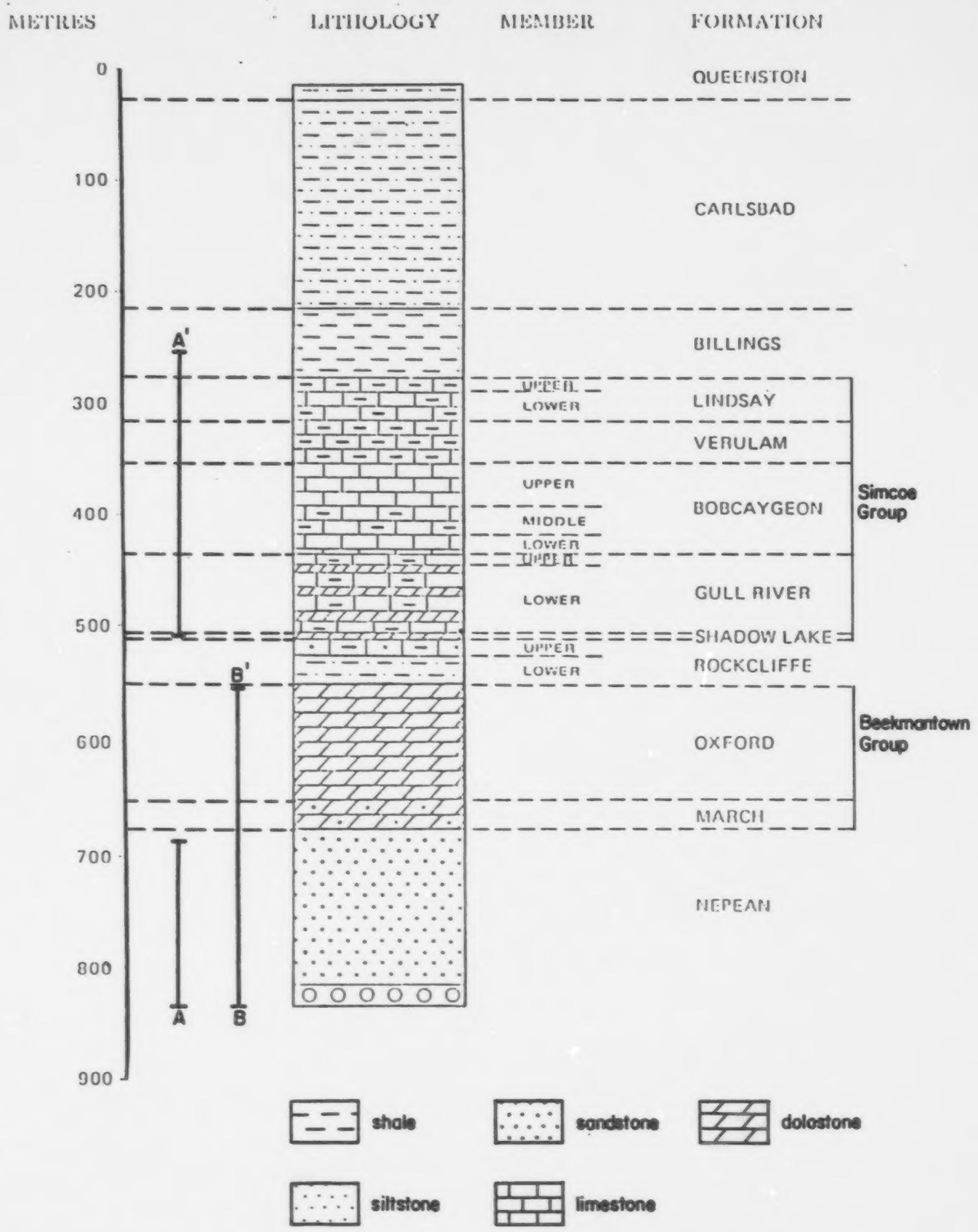
METRES
LITHOLOGY
MEMBER
FORMATION
0
100
200
300
400
500
600
700
800
900
A'
A
B'
B
QUEENSTON
CARLSBAD
BILLINGS
UPPER
LOWER
LINDSAY
VERULAM
UPPER
BOBCAYGEON
MIDDLE
LOWER
UPPER
LOWER
GULL RIVER
SHADOW LAKE
UPPER
LOWER
ROCKCLIFFE
Simcoe Group
OXFORD
MARCH
Beekmantown Group
NEPEAN
shale
sandstone
dolostone
siltstone
limestone

Figure 7: Paleozoic Stratigraphy in Southeastern Ontario (from Williams and Telford, 1986). The column represents stratigraphy of the Geological Survey of Canada, Russel well near Ottawa. Bars AA' and BB' indicate formations present within the study area west of the Frontenac Axis (AA') and east of the Frontenac Axis (BB').

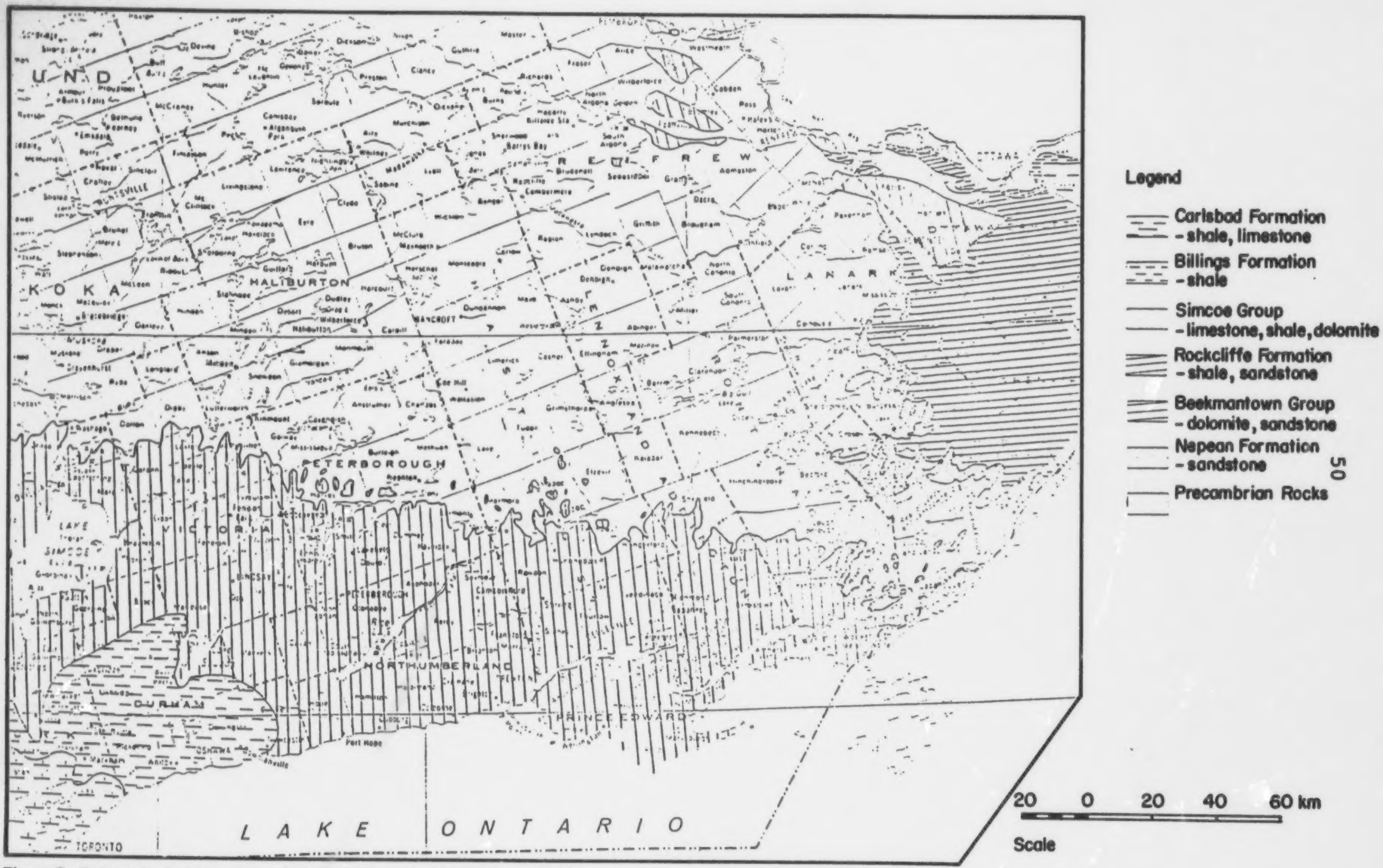
U N D
K O K A
HALIBURTON
R E N F R E W
L A N A R K
PETERBOROUGH
VICTORIA
NORTHUMBERLAND
DURHAM
PRINCE EDWARD
LAKE SIMCOE
L A K E   O N T A R I O
TORONTO
Port Hope
BANCROFT
HUNTSVILLE
Legend
Carlsbad Formation - shale, limestone
Billings Formation - shale
Simcoe Group - limestone, shale, dolomite
Rockcliffe Formation - shale, sandstone
Beekmantown Group - dolomite, sandstone
Nepean Formation - sandstone
Precambrian Rocks
20
0
20
40
60 km
Scale

Figure 8: Paleozoic Geology Map, Eastern Ontario (after Hewitt, 1972).

building stone. The tests were performed by the Mineral Sciences Laboratories of CANMET (Mineral and Energy Technology Division of Energy, Mines, and Resources, Canada). Test results are summarized in Table 9. A complete report on test procedures and results by R.L. Chevrier of MSL-CANMET is included in Appendix 4.

All samples meet the ASTM requirements for granite and marble building stone with the exceptions of sample 31 from property 85-HUG-02 (Tweed Marble Quarry) which has a slightly lower than required abrasion resistance and sample 71 from 86-OSO-012 which fails to meet the specified value for modulus of rupture. However, a promotional brochure on Tweed Marble (in Kingston et al, 1985) lists the abrasion resistance as 19, indicating that physical properties may vary considerably within a deposit due to variations in texture, mineralogy, and fracturing. In general, the granites and marbles of the area meet the physical requirements of the building stone industry, and ASTM testing need not be considered until a prospect has been judged to be sufficiently favourable with respect to colour, texture, and jointing to warrant a test quarry.

Table 9: Summary of ASTM test results

Type of Stone	Sample No.	Property No.	ASTM C97 Absorption (by weight) %	ASTM C97 Bulk Specific Gravity	ASTM C241 Abrasion Resistance, Ha	ASTM C99 Modulus of Rupture, MPa	ASTM C170 Compressive Strength, MPa 51X51X76-mm specimens	ASTM C170 Compressive Strength, MPa corresponding cube strength	ASTM C880 Flexural Strength, Mpa
Granite	ASTM requirement		0.40 (max.)	2.56 (min.)	*	10.34 (min.)	131 (min)	131 (min)	* *
	1	85-STC-02	0.11	2.68	62.9	11.8	176.8	190.0	13.1
	10	85-RLL-01	0.17	2.66	68.6	11.6	211.0	226.9	15.0
Granite	12	85-RLL-04	0.04	2.76	67.7	15.2	169.6	182.2	15.3
	13	85-FLL-05	0.07	2.72	71.0	13.2	191.2	205.2	13.3
	52	86-ELE-004	0.10	2.72	64.0	11.5	141.9	153.0	
	92	85-MCN-01	0.15	2.61	51.2	11.6	144.0	154.8	10.0
Marble (exterior)	ASTM requirement		0.75 (max)	2.595 (min.-calcite) 2.800 (min.-dolomite)	10 (min.)	7 (min.)	52 (min.)	52 (min.)	* *
Marble (calcite)	29	86-DCN-001	0.02	2.78	23.1	10.2	153.0	164.8	5.3
(dolomitic)	31	85-HDG-002	0.04	2.87	9.6	9.3	169.0	181.7	5.7
(calcitic)	71	86-OSO-012	0.39	2.73	10.7	6.3	79.4	85.0	5.6

* not established

** not required under ASTM standards for building and structural granite and marble.

- ASTM requirements from 1985 Annual Book of ASTM Standards, Section 4 -- Constuction, Vol. 4.08 - Soil and Rock; Building Stones

SUMMARY

Several areas of Precambrian rock in eastern Ontario have been identified as having good potential for building stone deposits. Although large areas with consistent colour, texture, and joint patterns are rare because of the complex metamorphic and structural history of the Grenville rocks, local metamorphic/structural conditions have produced areas with potential for development of building stone deposits of moderate size. With respect to granite, these include areas of high grade metamorphism (Frontenac Axis) in which high temperatures have allowed the intrusion of plutonic rocks with little resistance, and lower grade areas in which relatively incompetent rocks such as marbles have absorbed tectonic stresses through deformation, leaving the more competent plutonic rocks relatively undeformed (Hastings Basin, Glamorgan-Cardiff Belt).

Marbles of the Central Metasedimentary Belt, particularly the Hastings Basin, locally show good potential for dimension stone as well as for crushed rock and terrazzo chips. Because of inconsistent colours and textures caused by tight folding, the potential for large quarries is not high, but deposits of marketable stone in quantities sufficient to fill the needs of domestic markets are present within the study area.

The increase in demand for building stone in both commercial and residential markets and improvements in stone processing technology have made the development of smaller quarries more economically feasible than in the past. Several areas of moderate to good building stone potential, described in this report, warrant further investigation and other areas in eastern Ontario with similar geologic characteristics should also be considered as exploration targets.

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Appendix 1
1985 Property Examination Summaries

1985 Property Report Summaries

Ontario Gneiss Segment

1. Granite properites with limited to moderate jointing

Prop. No.	Township	Colour	Texture	Rock Type	Status
BAX-01	Baxter	pink-grey	gneissic, variable	granitic gneiss	Prospect
BAX-03	Baxter	pink-grey	gneissic, variable	granitic gneiss	Prospect
CAR-01	Carling	pink	gneissic, variable	granitic gneiss	Prospect
COS-01	Cosby	brown	massive, uniform	quartz monzonite	Prospect
MUS-02	Muskoka Lakes	pink	gneissic, uniform	granitic gneiss	Prospect
RYE-01	Ryerson	grey	gneissic, variable	granitic gneiss	Prospect
SHIM-01	South Himsworth	greenish mauve-brown	porphyritic, uniform	syenite	Prospect
SHIM-02	South Himsworth	pink	porphyritic, uniform	quartz monzonite	Prospect
STR-01	Strong	grey	gneissic, uniform	porphyritic gneiss	Prospect

2. Granite properties with irregular or intensive jointing

BAX-02	Baxter	black	massive variable	mafic synite	Prospect
BAX-04	Baxter	pink-grey	gneissic, variable	granitic gneiss	Prospect
CHI-01	Chisholm	pink-grey	gneissic, variable	granitic gneiss	Prospect
CHI-02	Chisholm	pink-grey	gneissic, uniform	granitic gneiss	Prospect
MCM-01	McMurrich	green-black	massive, uniform	mafic syenite	Prospect
MUS-01	Muskoka Lakes	pink-grey	gneissic, variable	granitic gneiss	Prospect
MUS-03	Muskoka Lakes	pink-grey	gneissic, variable	granitic gneiss	Prospect
MUS-04	Muskoka Lakes	grey-black	foliated, variable	gabbro	Prospect
RYE-02	Ryerson	green-black	massive, uniform	gabbro	Prospect
RYE-03	Ryerson	green-black	massive, uniform	gabbro	Prospect

1985 Property Report Summaries

Central Metasedimentary Belt-Granite

1. Granite properties with limited to moderate jointing

Prop. No.	Township	Colour	Texture	Rock Type	Status
BUR-01	Burleigh	mauve-pink	variable, porph-mass.	pophyritic granite	prospect
CAR-01	Carlow	grey	mass-foliated	tonalite	prospect
DUN-06b	Dungannon	dark grey	mass, uniform	gabbro	prospect
FLL-01	Front of Leeds & Lansdowne	brown-red	massive, uniform	syenite	past producer
FLL-02	Front of Leeds & Lansdowne	pink	massive, uniform	syenite	past producer
FLL-04	Front of Leeds & Lansdowne	red-brown	massive, uniform	syenite	past producer
KAL-01	Kaladar	grey-green	massive, uniform	ultramafic	past producer
MON-01	Monmouth	pink	massive,	quartz monzonite	prospect
RAG-01	Raglan	pink	gneissic, variable	granitic gneiss	prospect
RLL-01, 02	Rear of Leeds & Lansdowne	pink-red	massive, uniform	granite	active quarry
RLL-04	Rear of Leeds & Lansdowne	grey	weak fol, uniform	quartz diorite	test quarry
RLL-06	Rear of Leeds & Lansdowne	brown	porphyritic, uniform	syenite	prospect
RLL-07	Rear of Leeds & Lansdowne	brown	foliated, uniform	syenite	prospect
RLL-08	Rear of Leeds & Lansdowne	pink	massive, uniform	quartz syenite	test quarry
STO-01	Storrington	pink	massive, uniform	granite	active quarry
WOL-01	Wollaston	pink	massive, uniform	quartz syenite	past producer

2. Granite properties with irregular or intensive jointing

Prop. No.	Township	Colour	Texture	Rock Type	Status
CAV-01	Cavendish	pink-brown	foliated, uniform	granite	prospect
CAV-02	Cavendish	grey-black	foliated, uniform	diorite-gabbro	prospect
ELI-01	Elizabethtown	pink-grey	massive, uniform	granite	prospect
ELI-02	Elizabethtown	pink-red	porph-mass.	granite	prospect
FLL-03	Front of Leeds & Lansdowne	red-brown	massive, uniform	syenite	past producer
FLL-05	Front of Leeds & Lansdowne	grey-green to red	massive, uniform	syenite	past producer
FOE-01	Front of Escott	grey-brown	massive, variable	granite	prospect
FOE-02	Front of Escott	grey-black	mass. to fol.	metasediment	prospect

FOY-01	Front of Yonge	brown	mass. to fol.	syenite	prospect
GLA-01	Glamorgan	green-grey	foliated, uniform	gabbro	prospect
GLA-02	Glamorgan	grey	foliated, uniform	gabbro	prospect
HUG-01	Hungerford	pink-red	foliated, uniform	granite gneiss	past producer
PIT-01	Pittsburgh	brown	porphyritic variable	syenite	past producer
PIT-02	Pittsburgh	green-grey	gneissic, uniform	gneiss	past producer
RLL-05	Rear of Leeds & Lansdowne	buff-grey	massive, uniform	syenite	prospect
ROY-01	Rear of Yonge	pink-brown	massive, uniform	granite	prospect
STO-02	Storrington	pink	foliated uniform	granite	prospect
WOL-02	Wollaston	black	massive, uniform	diabase	test quarry
WOL-03*	Wollaston	black	massive, uniform	gabbro	prospect

(* Lot 22, Concession 9, Wollaston Twp. not included in OFR 5585)

1985 Property Report Summaries

Central Metasedimentary Belt - Marble

1. Marble properties with limited to moderate jointing

Prop. No.	Township	Colour	Texture	Rock Type	Status
DUN-01	Dungannon	white to pale brown	mass. fol.	dolomitic marble	past producer
DUN-02	Dungannon	pale blue-brown-green	banded	dolomitic marble	past producer
DUN-06	Dungannon	dark grey-brown	massive-bedded	dolomitic marble	prospect
HUG-02	Hungerford	white-green	mass-fol.	dolomitic marble	past producer
HUN-04	Huntingdon	pale green to purple	uniform, massive	calcitic marble	active quarry
MAR-02	Marmora	pale green	massive, uniform	calcitic marble	prospect
MAR-03	Marmora	pale-dark green	foliated, variable	calcitic marble	past producer
MAR-04	Marmora	buff-pink-blue-grey	foliated, variable	calcitic marble	past producer
MAY-02	Mayo	white-brown	banded	dolomitic marble	prospect
RAG-01	Raglan	white to blue-grey	mass-fol.	calcitic marble	prospect

2. Marble properties with irregular or intensive jointing

Prop. No.	Township	Colour	Texture	Rock Type	Status
DAR-01	Darling	white-green-grey	variegated	sepentinized marble	past producer
DUN-05	Dungannon	white-pale green	mass-fol.	dolomitic marble	prospect
DUN-06c	Dungannon	pink-white-green	banded	calcitic marble	prospect
MAD-01	Madoc	dark grey-black	massive to banded	calcitic marble	active quarry
MAD-04	Madoc	white-pink-grey	banded	calcitic marble	past producer
NOR-01	Somerville	white	mass-fol.	dolmitic marble	prospect

Appendix 2
1986 Property Examination Reports
Granite
Marble
Limestone

1986 Granite Properties

ABBOTTS HILL INTRUSION

LOCATION: SOUTHERN KENNEBEC TOWNSHIP TRENDING NORTHEAST INTO OLDEN TOWNSHIP
NEAR TOWN OF MOUNTAIN GROVE
NTS 31C/10 OGS MAP #2449
GEOLOGIC REPORT #216

SAMPLE SITES: 86-OLD-007, 86-OLD-008, 86-OLD-009, 86-KEN-007, 86-KEN-008, 86-KEN-009, 86-KEN-010

DESCRIPTION OF AREA

The Abbotts Hill Intrusion runs northeast-southwest from Kennebec township into Olden townshp. The length of the intrusion is approximately 15 km along which three dominant rock types are encountered. The first rock type, found in the northern part of the intrusion, is mainly biotite granodiorite but some biotite quartz monzonite does occur. Towards the center of the intrusion the rock trends toward a biotite trondjemite and at the southern extent of the intrusion the rock becomes dominantly biotite quartz monzonite.

Three samples were taken from the northern end of the intrusion near Mountain Grove. These samples are 86-OLD-007, 008, 009. The rock here is a foliated, fine to medium grained biotite granodiorite that displays an unattractive greyish-brownish-pink colour.

Jointing in this area is very intense and varies from regular to irregular, limiting the potential for extraction of large quarry blocks.

Other deleterious features found in the area include the presence of pegmatite dykes, quartz pods and stringers, aplite dykes and some minor exfoliation. No deleterious minerals were noticed.

To the south of this area four more samples were taken (86-KEN-007, 008, 009, 010). These samples were also mainly biotite granodiorite. All features of this area appear to be similar to those of the northern part of the intrusion.

The southern part of the intrusion is mainly biotite quartz monzonite. No samples were taken from this area due to access limitations.

CONCLUSIONS

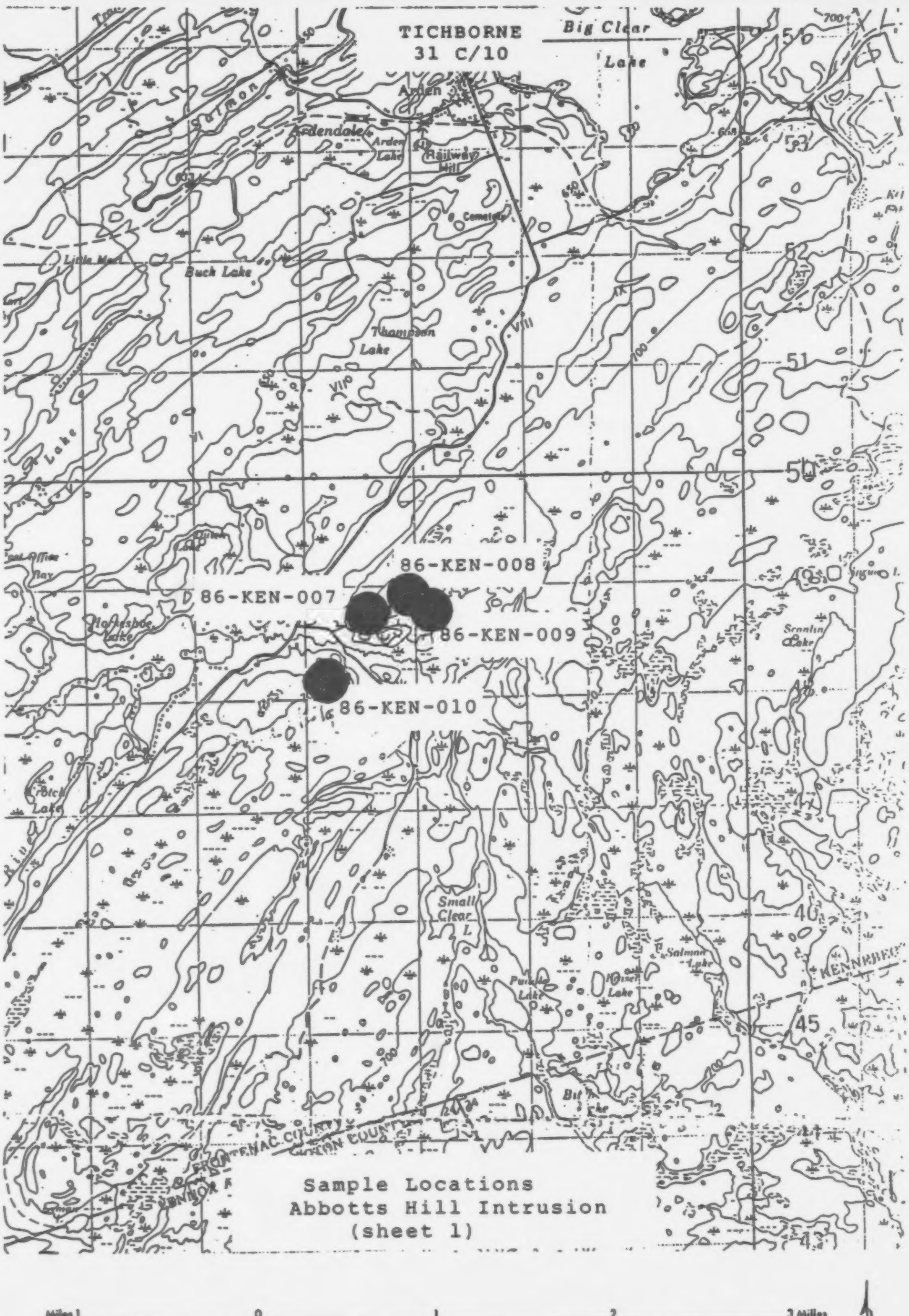
The Abbotts Hill Intrusion does not seem to favour the development of a building stone quarry. The rock found here is not particularly attractive and the intense jointing limits the area as far as large block extraction is concerned.

POTENTIAL

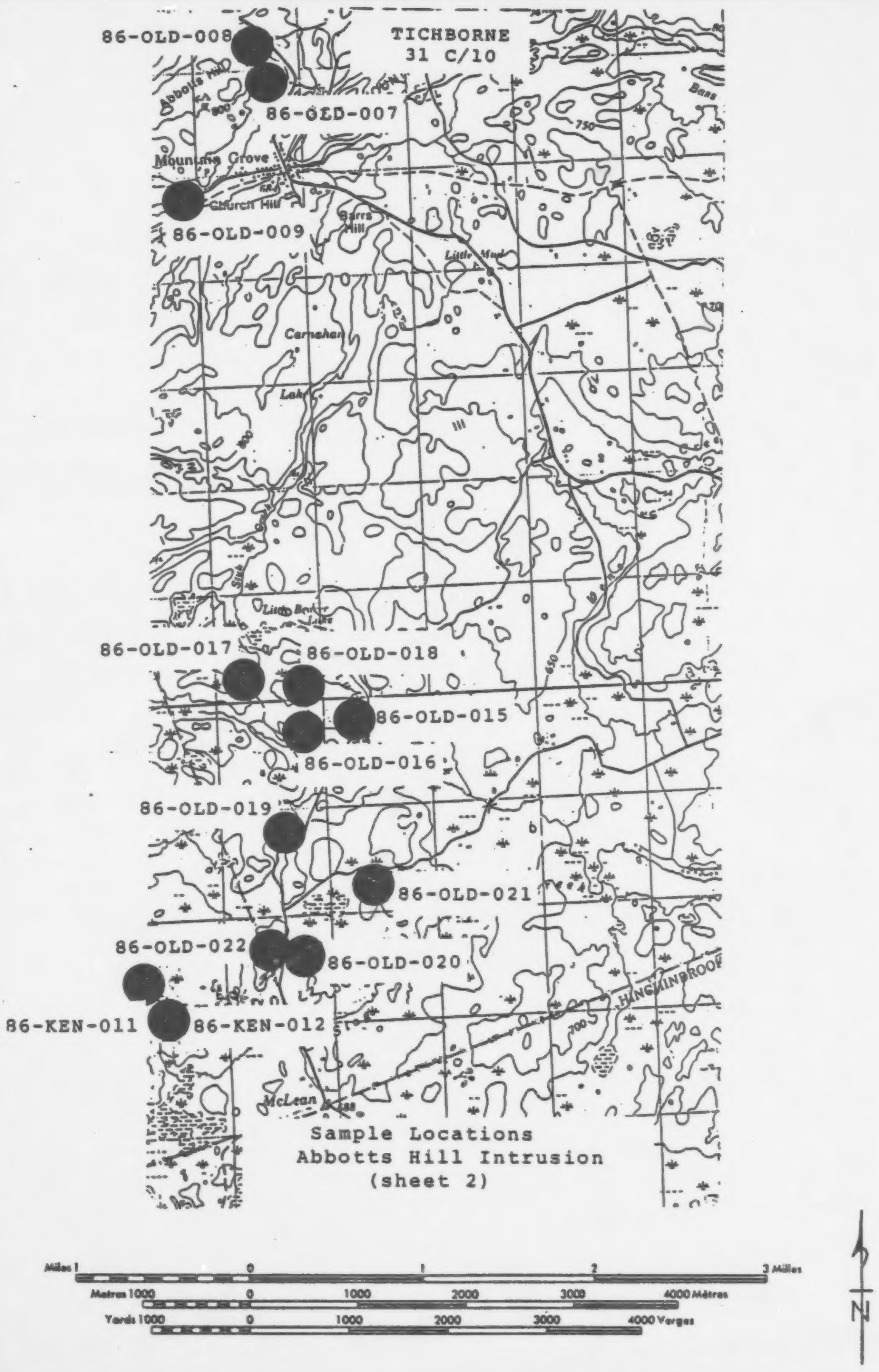
POOR	MODERATE	GOOD
86-OLD-007		
86-OLD-008		
86-OLD-009		
86-KEN-007		
86-KEN-008		
86-KEN-009		
86-KEN-010		

REFERENCES

Wolff, J.M.
1982: Geology of the Long Lake Area; Ontario Geological Survey, Report 216, 76p. Accompanied by Map 2449, scale 1:31 680 or 1 inch to 1/2 mile.


TICHBORNE
31 C/10
Big Clear Lake
Arden
Ardendale
Arden Lake
Railway Hill
Cemetery
Little Mud
Buck Lake
Thompson Lake
Horseshoe Lake
Crotch Lake
Small Clear L
Salmon Lake
Puzzle Lake
Kennebec
Frontenac County
Addington County
Scanlan Lake
86-KEN-007
86-KEN-008
86-KEN-009
86-KEN-010
53
51
50
45
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Abbotts Hill Intrusion
(sheet 1)


TICHBORNE
31 C/10
86-OLD-008
86-OLD-007
86-OLD-009
Abbotts Hill
Mountain Grove
Church Hill
Barrs Hill
Little Mud
Carnahan
Lake
Bass
750
Little Beaver Lake
86-OLD-017
86-OLD-018
86-OLD-015
86-OLD-016
86-OLD-019
86-OLD-021
86-OLD-022
86-OLD-020
86-KEN-011
86-KEN-012
HINCHINBROOK
McLean
700
650
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Abbotts Hill Intrusion
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-OLD-007 **Pluton Name** Abbotts Hill Intrusion

Property Name Abbotts Hill 1 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Olden **Lot** 14 **Con.** 2

NTS 31C/10 **UTM Co-ordinates: Easting** 353700 **Northing** 4955900

Property Status Prospect **Air Photo No.** 78-4452-157-75

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark grey-brown

Weathered Surface Grey-pink

Uniform **Variable** X

Weathering Depth: 1 mm

Grain Size: fine to medium **Uniform** **Variable** X

Texture: (gneissic) **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 140 degrees
Dip 29 degrees E

Formed By Alignment of mafics, gneissosity

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 020 degrees **Dip** Vertical **Spacing** < 1 m

B) Strike 120 degrees **Dip** Vertical **Spacing** < .5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Biotite, quartz, K-spar, plagioclase

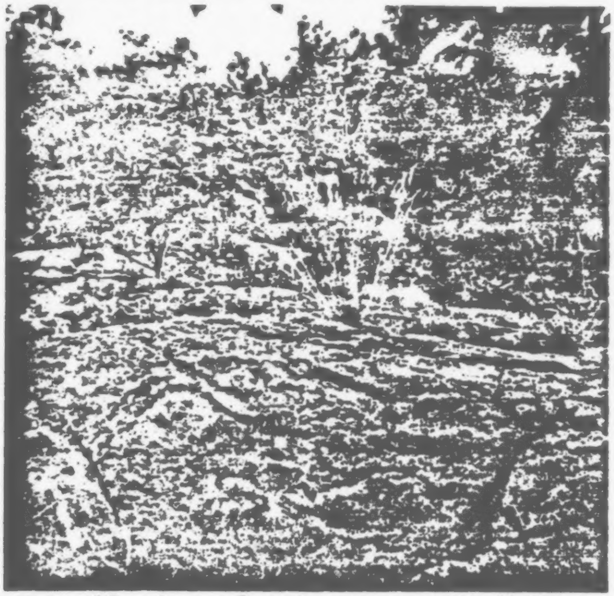
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Many pegmatite/quartz pods and stringers

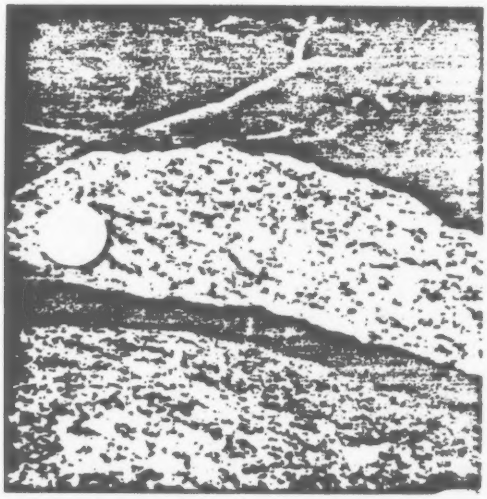
Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: The gneissosity has been deformed by macro folding. Intense jointing, numerous pegmatite dikes and quartz veining limit the possibility of procuring quarry blocks.



Overall view of outcrop area. Note close spaced jointing and good exposure. 86-OLD-007



Fresh surface exhibiting a grey-brown colour, fine to medium grain size and a gneissic texture. 86-OLD-007

BUILDING STONE INVENTORY

Property No. 86-OLD-008 **Pluton Name** Abbotts Hill Intrusion

Property Name Abbotts Hill 2 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Olden **Lot** 14 **Con.** 2

NTS 31C/10 **UTM Co-ordinates: Easting** 353550 **Northing** 49556200

Property Status Prospect **Air Photo No.** 78-4452-157-75

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink with black

Weathered Surface Pink/grey

Uniform X **Variable**

Weathering Depth: 2-3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 140 degrees **Dip** 22 degrees SE

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A)	**Strike**	140 degrees	**Dip**	vertical	**Spacing**	.5-2 m .7 m avg.
B)	**Strike**	80 degrees	**Dip**	vertical	**Spacing**	up to 1 m
C)	**Strike**	horizontal	**Dip**	0 degrees	**Spacing**	.1-.5 m
D)	**Strike**		**Dip**		**Spacing**	

Potential For Quarry Blocks: Poor

Mineralogy: Quartz, plagioclase, biotite, K-spar

Deleterious Minerals: Yes No X Type Percent

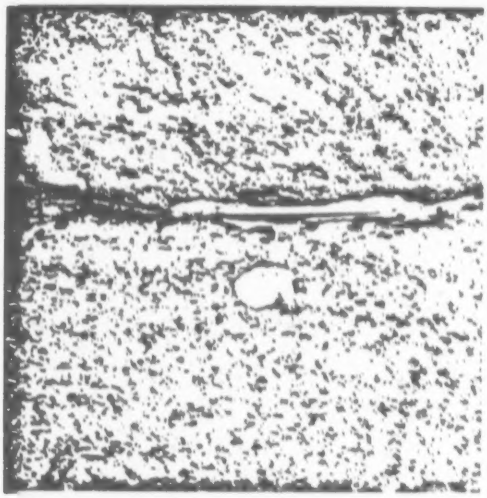
Other Features: Pegmatite dikes, numerous aplite dikes, quartz and granitic stringers, hematite staining

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good X Fair Poor

Comments: The rock contains numerous pegmatitic and aplitic phases, and quartz and granitic stringers and veins. Jointing is intense.

Overall view of outcrop depicting horizontal sheeting and good exposure. 86-OLD-008



Granitic stringer with biotite quartz monzonite. 86-OLD-008

BUILDING STONE INVENTORY

Property No. 86-OLD-009 **Pluton Name** Abbotts Hill Intrusion

Property Name Abbotts Hill 3 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Olden **Lot** 15 **Con.** 2

NTS 31C/10 **UTM Co-ordinates: Easting** 352850 **Northing** 4954800

Property Status Prospect **Air Photo No.** 78-4451-143-104

Production History None

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Greyish-whitish-pink

Weathered Surface greyish-white

Uniform **Variable** X

Weathering Depth: 2 mm

Grain Size: Fine to medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Gneissic layering

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 140 degrees **Dip** 90 degrees **Spacing** .1-2 m

.5 m avg. m

B) Strike 30 degrees **Dip** 90 degrees **Spacing** .1-2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Quartz, plagioclase, biotite, K-spar

Deleterious Minerals: Yes **No** X **Type** **Percent**

Deleterious Minerals: Yes No X Type Percent

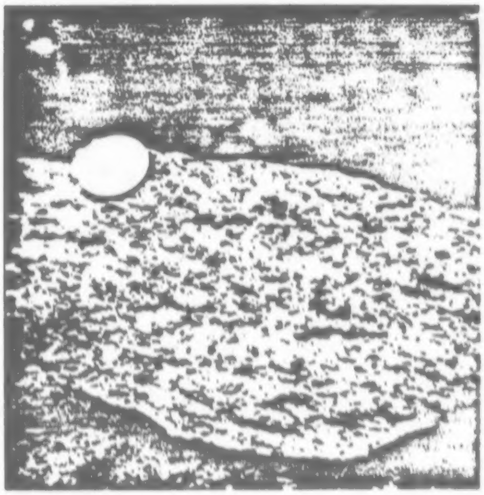
Other Features: Quartz veins, some pegmatite dykes, minor exfoliation

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good X **Fair Poor**

Comments: Quartz veins and pegmatite dykes are predominant and jointing is intense. Gneissic banding is undeformed and uniform.

Overall view of outcrop area depicting intense jointing and good exposure. 86-OLD-009



Fresh surface showing gneissic texture, fine to medium grain size, and greyish-white-pink colour. 86-OLD-009

BUILDING STONE INVENTORY

Property No. 86-KEN-007 **Pluton Name** Abbotts Hill Intrusion

Property Name Horseshoe Lake 1 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Kennebec **Lot** 7 **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 346450 **Northing** 4948750

Property Status Prospect **Air Photo No.** 78-4447-130-99

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink with black

Weathered Surface Pink/grey

Uniform **Variable** X

Weathering Depth: 2-5 mm

Grain Size: Medium to fine **Uniform** **Variable** X

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 0 degrees
Dip 30 degrees E

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 0 degrees **Dip** vertical **Spacing** 0.1 - 1 m

B) Strike 120 degees **Dip** vertical **Spacing** .2 to .5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Biotite quartz, plagioclase, K-spar, muscovite

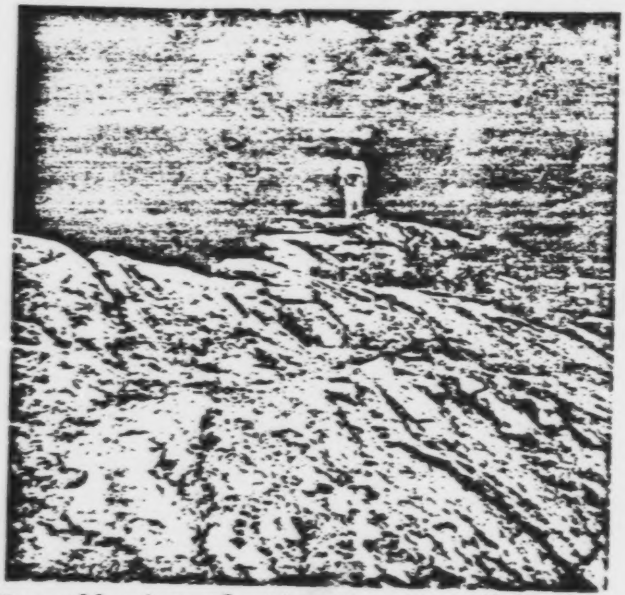
Deleterious Minerals: **Yes** X **No** **Type** (pyrite) **Percent** Trace

Other Features: Hematite staining, many pegmatitic feldspar quartz pods, pegmatite dikes, aplite inclusions, moderate exfoliation.

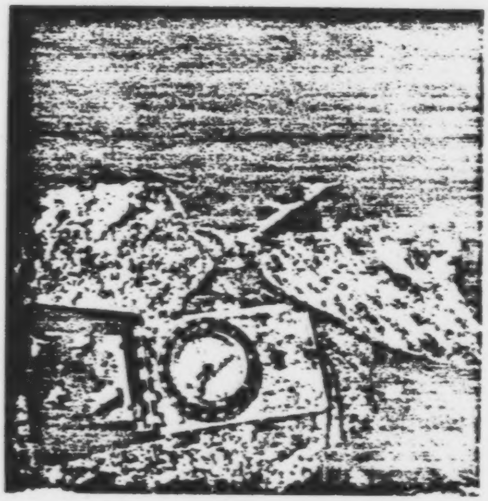
Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This outcrop exhibits considerable variation in both mineralogy and grain size. Other deleterious features include pegmatite and aplitic phases, intense jointing and hematite staining.



Overall view of outcrop area. Note irregular close spaced jointing. 86-KEN-007



Note colour and texture of fresh surface. 86-KEN-007

BUILDING STONE INVENTORY

Property No. 86-KEN-008 **Pluton Name** Abbotts Hill Intrusion

Property Name Horseshoe Lake 2 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Kennebec **Lot** 7 **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 346950 **Northing** 4948900

Property Status Prospect **Air Photo No.** 78-4447-130-99

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Light pink/grey banded

Weathered Surface Pinkish grey

Uniform **Variable** X

Weathering Depth: 2-5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 5 degrees
Dip 46 degrees E

Formed By Gneissosity

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 130 degrees	**Dip** NR Vertical	**Spacing** .1-1 m
B) Strike 5 degrees	**Dip** 46 degrees E	**Spacing** .1-2 m
C) Strike	**Dip**	**Spacing**
D) Strike	**Dip**	**Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Biotite plagioclase, K-spar, quartz

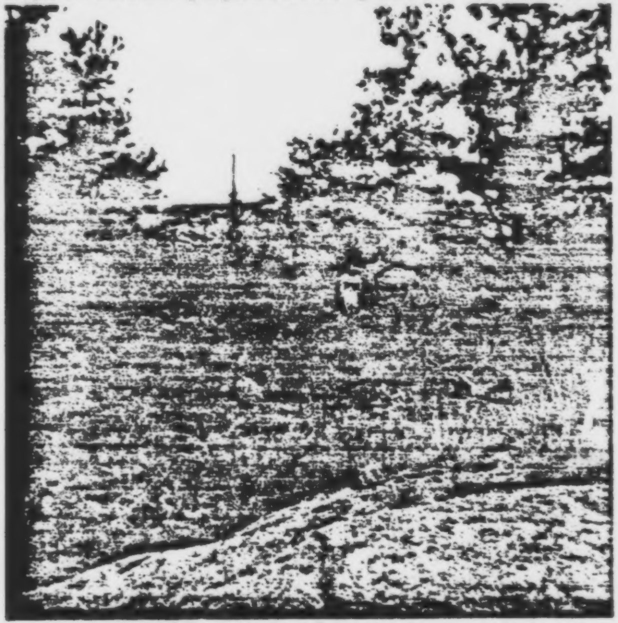
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz feldspar pods and veins; moderate exfoliation, staining

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a medium grained, gneissic granodiorite of the Abbotts Hill Intrusion. The gneissosity has been deformed on a macro scale. The intense jointing and prevalent pegmatitic phases diminish the building stone potential.



Overall view of outcrop area.
86-KEN-008.

BUILDING STONE INVENTORY

Property No. 86-KEN-009 **Pluton Name** Abbotts Hill Intrusion

Property Name Horseshoe Lake 3 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Kennebec **Lot** 7 **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 347050 **Northing** 4948900

Property Status Prospect **Air Photo No.** 78-4447-130-99

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey with black

Weathered Surface Dark grey

Uniform **Variable** X

Weathering Depth: 2-3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern (X) **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Biotite, K-spar, plagioclase, quartz

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veining, pegmatite pods, exfoliation

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: To the west, increasing plagioclase in the rock causes it to lose its "salt and pepper" appearance. Jointing is regular to irregular and spacing is difficult to correlate. Diorite is localized. This rock is a massive, medium grained grey granodiorite. Jointing is intense, limiting quarry block size. Few other deleterious features were observed.

View of rock face showing major joints. Many smaller fractures as well as exfoliation patches are present but not visible in photo. 86-KEN-009

BUILDING STONE INVENTORY

Property No. 86-KEN-010 **Pluton Name** Abbotts Hill Intrusion

Property Name Horseshoe Lake 4 **Commercial Stone Name** Granite

Geological Rock Name Biotite Granodiorite

Township Kennebec **Lot** 7 **Con.** 6

NTS 31C/10 **UTM Co-ordinates: Easting** 346100 **Northing** 4548200

Property Status Prospect **Air Photo No.** 78-4447 130-99

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Light pinkish grey

Weathered Surface Pink and dark grey

Uniform X **Variable**

Weathering Depth: 2-5 mm

Grain Size: Medium/fine **Uniform** X **Variable**

Texture: Foliated to gneissic **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** 20 degrees **Dip** ?

Formed By Alignment of biotite, gneissosity

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 120 degrees **Dip** vertical **Spacing** .2 - .5 m

B) Strike 185 degrees **Dip** vertical **Spacing** .4 - .7 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Biotite, quartz, k-spar, plagioclase

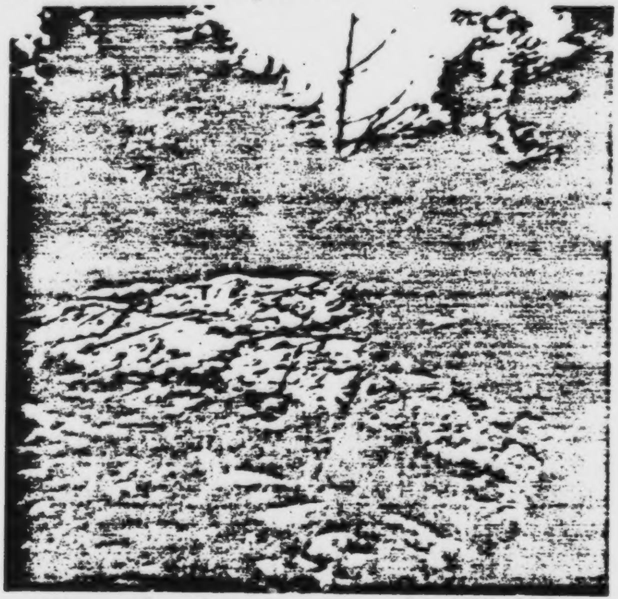
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Aplite inclusions, many quartz/feldspar dikes (2-20 cm wide)

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: Gneissosity results in pink and grey 1-5 cm banding locally. The rock is intensely jointed and heterogeneous.



View of outcrop area. 86-KEN-010

ADDINGTON INTRUSION

LOCATION: EXTENDS THROUGH SOUTHERN KALADAR, CENTRAL KENNEBEC, AND NORTHERN OLDEN TOWNSHIPS
NTS 31C/15 OGS MAP #2471
GEOLOGICAL REPORT #228

SAMPLE SITES: 86-OLD-003, 86-OLD-004

DESCRIPTION OF AREA

The Addington Intrusion in general is a band of foliated to gneissic biotite granite and quartz monzonite about 1 km wide trending northeasterly through several townships. The Areas examined in Olden township both lie within a wide shear zone mapped by Wolff (1985) along the southeastern margin of the intrusion. Although jointing is regular and moderate, pervasive shearing is accompanied by carbonate and clay mineral development, quartz veins, and rusty weathering.

CONCLUSIONS

Although the area examined shows little building stone potential due to shearing, the moderate, regular joint pattern suggests that there may be areas with better potential for quarry blocks toward the center of the intrusion, away from the shear zone mapped by Wolff (1985).

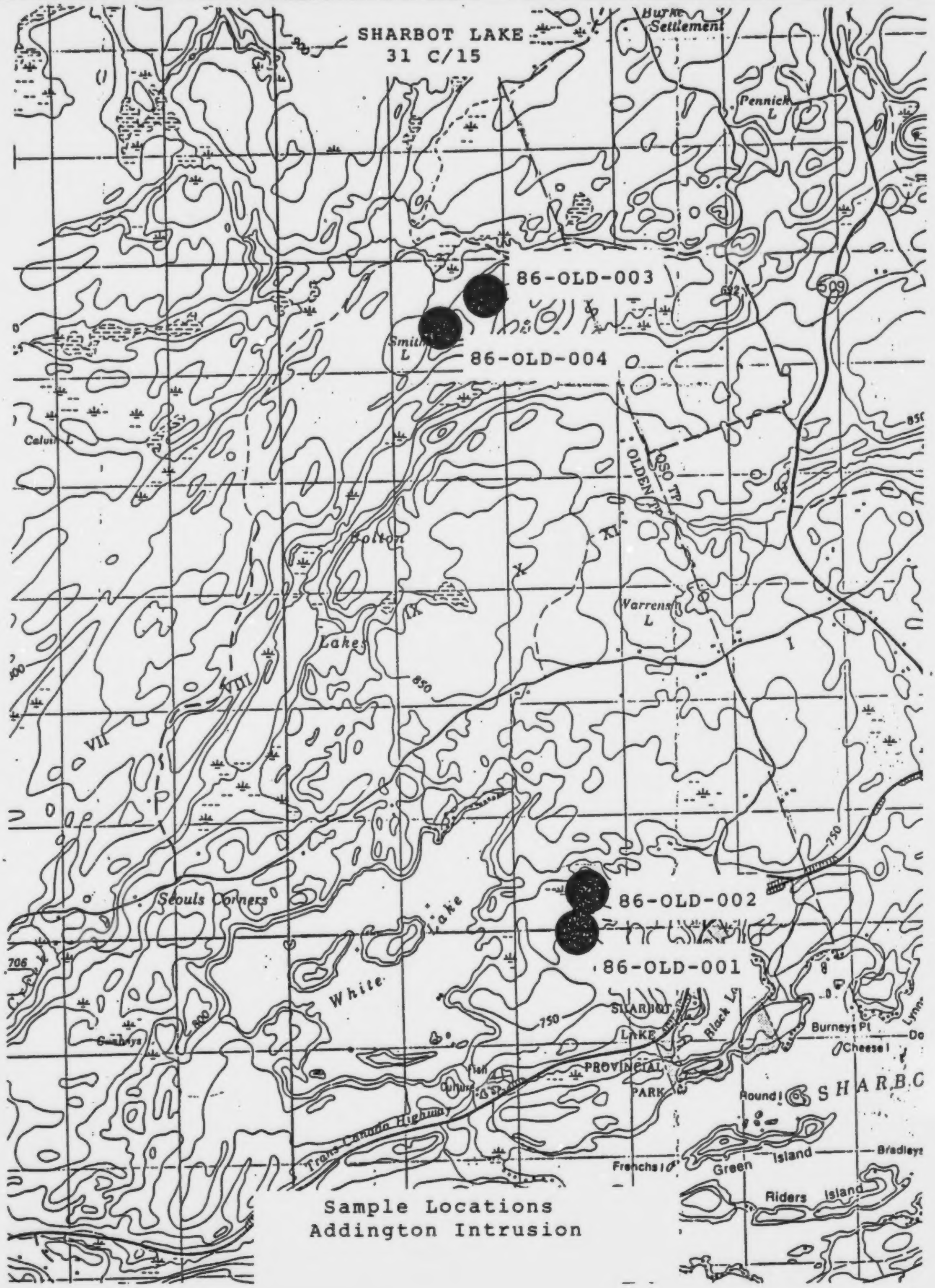
POTENTIAL

POOR	MODERATE	GOOD
86-OLD-003 86-OLD-004		

REFERENCES

Wolff, J.M.
1982: Geology of the Kaladar Area, Frontenac, and Lennox and Addington Counties; Ontario Geological Survey, Report 215, 94p. Accompanied by Map 2432, scale 1:31 680.

1985: Geology of the Sharbot Lake Area, Frontenac and Lanark Counties, Southeastern Ontario; Ontario Geological Survey Report 228, 70p. Accompanied by Map 2471, scale 1:31 680 or 1 inch to 1/2 mile.



Sample Locations
Addington Intrusion

SHARBOT LAKE
31 C/15
Burke Settlement
Pennick L
86-OLD-003
86-OLD-004
Smith L
Calvin L
509
692
850
OSO TP.
OLDEN TP.
Bolton
Lakes
Warrens L
VII
VIII
IX
X
XI
I
Seouls Corners
White Lake
86-OLD-002
86-OLD-001
706
800
750
SHARBOT LAKE PROVINCIAL PARK
Black L
Burneys Pt
Cheese I
Round I
SHARBOT
Trans Canada Highway
Frenchs I
Green Island
Riders Island
Bradleys
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges

BUILDING STONE INVENTORY

Property No. 86-OLD-003 **Pluton Name** Addington Intrusion

Property Name Smith Lake I **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 26 **Con.** 10

NTS 31C/15 **UTM Co-ordinates: Easting** 361750 **Northing** 4965650

Property Status Prospect **Air Photo No.** 78-4457-189-77

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Red

Weathered Surface Light pink with grey

Uniform X **Variable**

Weathering Depth: 2-8 mm

Grain Size: Medium to coarse **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** 10 degrees **Dip** 10 degrees E

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 120 degrees **Dip** Vertical **Spacing** .2-2 m

B) Strike 30 degrees **Dip** Vertical **Spacing** .5-2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Carbonate and clay minerals coat the slip planes, (rusty weathering) minor sheeting, pegmatite dikes 15 cm

Possible Uses: Curbing stone, ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a moderately foliated, medium grained, dark red granite. The carbonate and clay minerals present on shear planes weather to a rusty colour. Jointing occurs in regular patterns of moderate spacing, but the shear planes are pervasive and would limit quarry block size.

General view of dark red granite exhibiting regular jointing, and good exposure. 86-OLD-003

BUILDING STONE INVENTORY

Property No. 86-OLD-004 **Pluton Name** Addington Intrusion

Property Name Smith Lake II **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 25 **Con.** 10

NTS 31C/15 **UTM Co-ordinates: Easting** 361400 **Northing** 4965350

Property Status Prospect **Air Photo No.** 78-4457-189-77

Production History Nil

Use of Explosives: Yes . **No** X **Type**

Colour: Fresh Surface Red

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: $\leq$1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated (planar fabric due to shearing) **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod. Strong** X **Strike Dip**

Formed By Alignment of biotite, quartz, feldspar

Bedding: Yes No X **Strike Dip Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing Moderate Jointing X **Intensive Jointing** X

A) **Strike** 30 degrees **Dip** 85 degrees WNW **Spacing** 2-3 m

B) **Strike** 110 degrees **Dip** 75 degrees SW **Spacing** .2-2 m

Sheet-ing C) **Strike** Horizontal **Dip** 0 degrees **Spacing** 1-2 m average

D) **Strike Dip Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

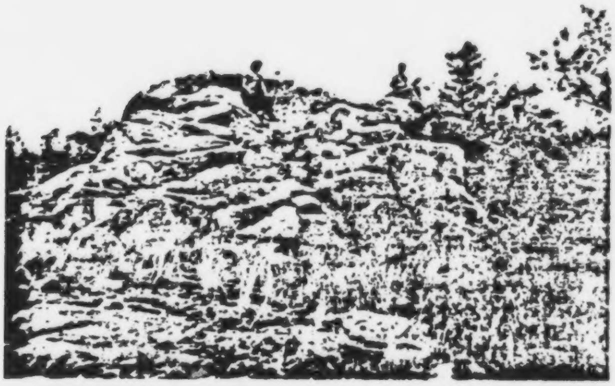
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Minor quartz veins and pods

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a medium-grained, well foliated red granite. Zones of shearing were also observed in this area. Vertical and horizontal joint sets repeat in a regular nature with a relatively close spacing. This factor, coupled with the presence of quartz veins and pods, limits the building stone potential of this area.



Extensive horizontal, closely-spaced,
joint sets in a light pink granite.
86-OLD-004

BEAVER CREEK COMPLEX

LOCATION: North central Tudor township, approximately 2 miles west of Gilmour.
NTS 31C/13 OGS MAP# 2168
GEOLOGICAL REPORT #67

SAMPLE SITES: 86-TUD-003, 86-TUD-004, 86-TUD-005, 86-TUD-006, 86-TUD-007, 86-TUD-008

DESCRIPTION OF AREA

The Beaver Creek Complex consists of variable lithologies. Lumbers (1969) maps this intrusion as a fine-grained to medium-grained, sometimes amphibole-rich, albite granite and syenite. He also describes breccias consisting of fine-grained albite granite and syenite fragments in a matrix ranging from marble (from metasedimentary inclusions) to a chloritic matrix to an amphibole-rich granite and syenite matrix. Mafic intrusives (called diorite - probably equivalent to Lumber's amphibole-rich albite granite and syenite) and felsic intrusives (primarily K-spar-quartz rocks) named granite or syenite based on the amount of quartz perceived were observed in the field. Also noted were breccias composed of felsic intrusive fragments hosted by sheared, sometimes vuggy and schistose, mafic intrusive or carbonate metasedimentary inclusions. Hybrids of the above lithologies could also occur.

The area examined was primarily in the southern half of the intrusion.

A number of small plugs exist between the Beaver Creek complex and the Wadsworth trondjemite north of Gilmour. These consist primarily of albite granite (Lumbers, 1969) and the three largest can all be approached easily from present roads. Mapping by Lumbers (1969) indicates good exposure (consistent with topographic highs), but variable lithology.

CONCLUSIONS

Work to date indicates that exposure is very poor and lithologies are extremely variable over small distances (<100 m) and often unsuitable for building stone purposes (sheared, schistose and brecciated).

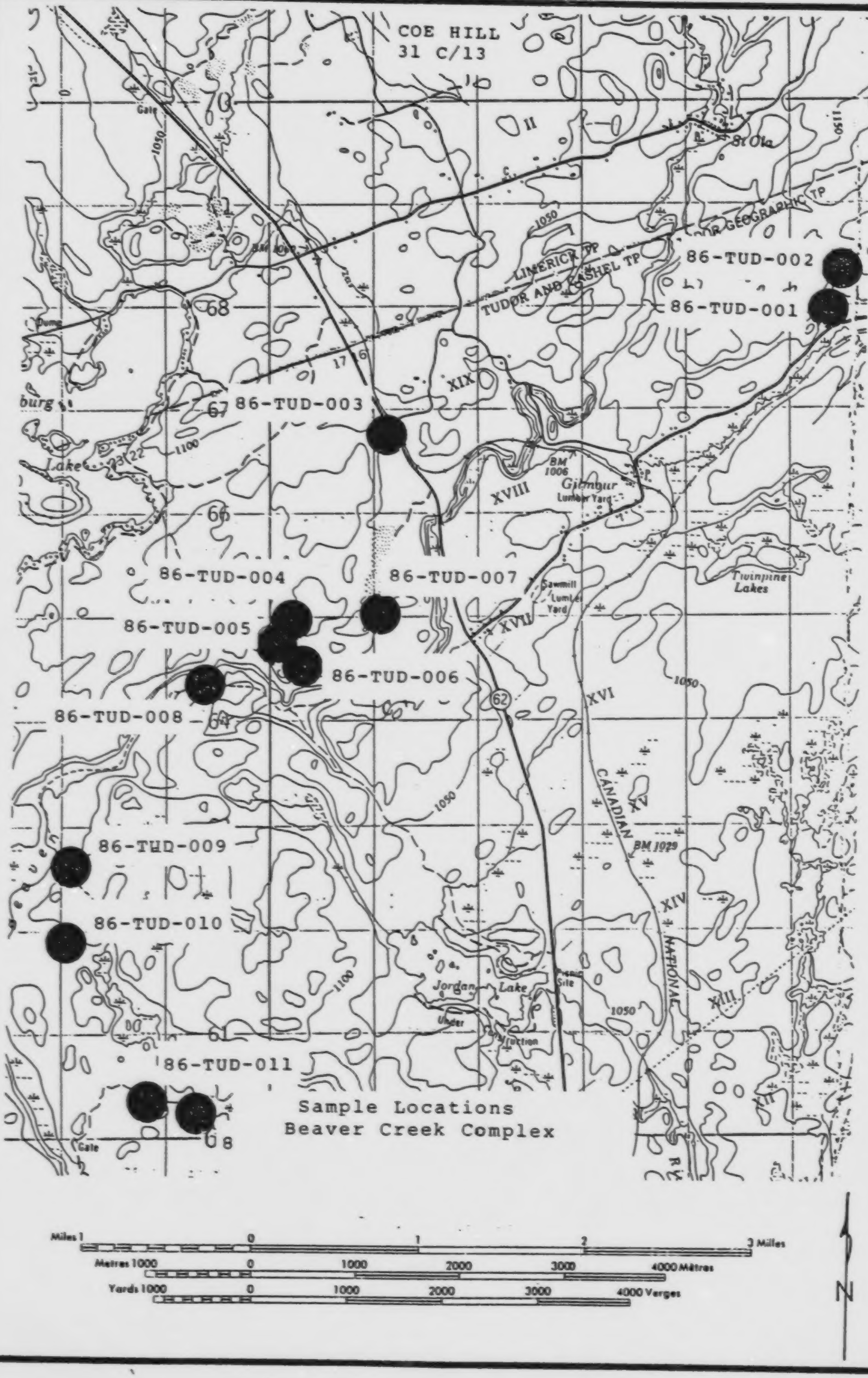
In conclusion, further work is not recommended. Building stone potential appears to be low. Uses of Beaver Creek lithologies are restricted, for the most part, to rubble.

POTENTIAL

POOR	MODERATE	GOOD
86-TUD-003		
86-TUD-004		
86-TUD-005		
86-TUD-006		
86-TUD-007		
86-TUD-008		

REFERENCES

Lumbers, S.B.
1969: Geology of Limerick and Tudor Townships, Hastings County, Ontario; Ontario Department of Mines, Geological Report 67.


COE HILL
31 C/13
86-TUD-001
86-TUD-002
86-TUD-003
86-TUD-004
86-TUD-005
86-TUD-006
86-TUD-007
86-TUD-008
86-TUD-009
86-TUD-010
86-TUD-011
St Ola
LIMERICK TP
TUDOR AND CASHEL TP
GEOGRAPHIC TP
Gilmour
Lumber Yard
Sawmill
Lumber Yard
Twinpine Lakes
Jordan Lake
Picnic Site
Under Construction
CANADIAN NATIONAL
BM 1006
BM 1029
62
XII
XIII
XIV
XV
XVI
XVII
XVIII
XIX
1050
1100
70
68
67
66
61
Gate
Lake
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Beaver Creek Complex

BUILDING STONE INVENTORY

Property No. 86-TUD-003 **Pluton Name** Beaver Creek Complex

Property Name Hwy. 62 - Beaver Creek (Phillips Road) **Commercial Stone Name** Granite

Geological Rock Name Granodiorite Granite

Township Tudor **Lot** 16 **Con.** 19

NTS 31C/13 **UTM Co-ordinates: Easting** 291200 **Northing** 4966800

Property Status Prospect **Air Photo No.** 78-4458-190-210

Production History Nil

Use of Explosives: Yes . **No** X **Type**

Colour: Fresh Surface Pinkish grey (to light green where brecciated)

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** (X) **Intensive Jointing** X

A) Strike 150 degrees **Dip** vertical **Spacing** 0.2-1 m

B) Strike subhorizontal **Dip** **Spacing** 0.5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite, mafics approx. 25 %

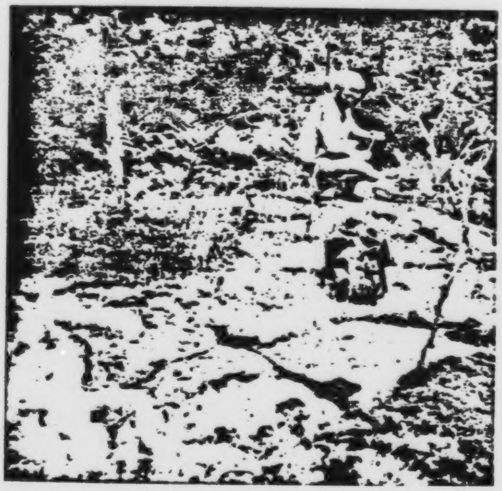
Deleterious Minerals: Yes No X Type Percent

Other Features: Rare occassional biotite slip planes; rare felsic stringers (<1 cm wide), feldspar alteration, brecciation

Possible Uses: Ashlar, paving stone, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: Rock is locally brecciated resulting in unaltered felsic fragments hosted by anfetud-004e-chlorite rich matrix. This brecciation and intense jointing limit the building stone potential of this site.



Typical outcrop exposure
exhibiting intense jointing.
86-TUD-003

BUILDING STONE INVENTORY

Property No. 86-TUD-004　　**Pluton Name** Beaver Creek Complex

Property Name Beaver Creek 1　　**Commercial Stone Name** Granite

Geological Rock Name Diorite-Gabbro

Township Tudor　　**Lot** 21　　**Con.** 17

NTS 31C/13　　**UTM Co-ordinates: Easting** 290150　　**Northing** 4964900

Property Status Prospect　　**Air Photo No.** 78-4456-165-35

Production History Nil

Use of Explosives: Yes　　**No** X　　**Type**

Colour: Fresh Surface Green-black

Weathered Surface Grey

Uniform X　　**Variable**

Weathering Depth: .5 cm

Grain Size: Fine (-medium)　　**Uniform**　　**Variable** X

Texture: Massive (to foliated)　　**Uniform**　　**Variable** X

Fabric: Yes　　**No.** X　　**Weak**　　**Mod.**　　**Strong**　　**Strike**　　**Dip**

Formed By

Bedding: Yes　　**No** X　　**Strike**　　**Dip**　　**Avg. Thickness**

Jointing: Regular Pattern　　**Irregular Pattern** X

Limited Jointing　　**Moderate Jointing**　　**Intensive Jointing** X

A) Strike horizontal　　**Dip** 0 degrees　　**Spacing** 0.5 m

B) Strike　　**Dip**　　**Spacing**

C) Strike　　**Dip**　　**Spacing**

D) Strike　　**Dip**　　**Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, amphibole; Mafic content: approx. 50%

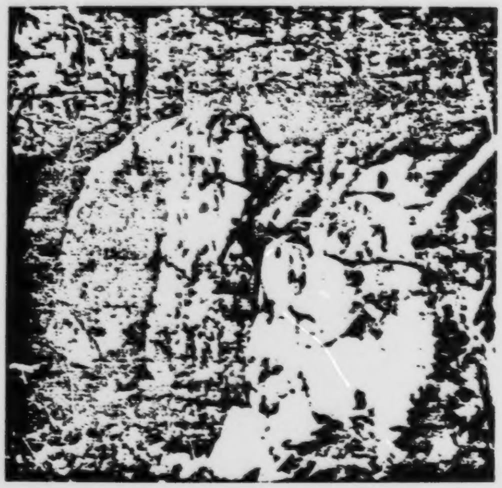
Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** 1%

Other Features: Variable amounts of amphibole; sulfide weathering

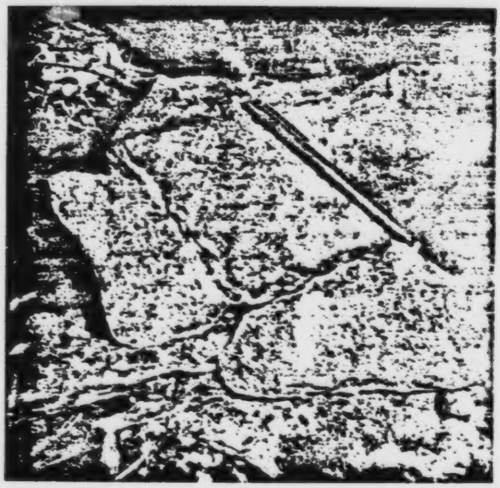
Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a massive medium grained, green to black coloured diorite (Gabbro). Deleterious features in this rock include moderate to intense irregular jointing and the presence of sulfides.



2 m high scarp exposure general outcrop appearance. 86-TUD-004



Close-up of massive, fine to medium grained green to black diorite (gabbro). 86-TUD-004

BUILDING STONE INVENTORY

Property No. 86-TUD-005 **Pluton Name** Beaver Creek Complex

Property Name Beaver Creek-2 **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Tudor **Lot** 21 **Con.** 17

NTS 31C/13 **UTM Co-ordinates: Easting** 290200 **Northing** 4964700

Property Status Prospect **Air Photo No.** 78-4456-165-35

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Bleached white

Uniform X **Variable**

Weathering Depth: $\leq$ .5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 040 degrees **Dip** 85 degrees S **Spacing** 0.2 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, minor quartz, chlorite; Mafics: <.5%

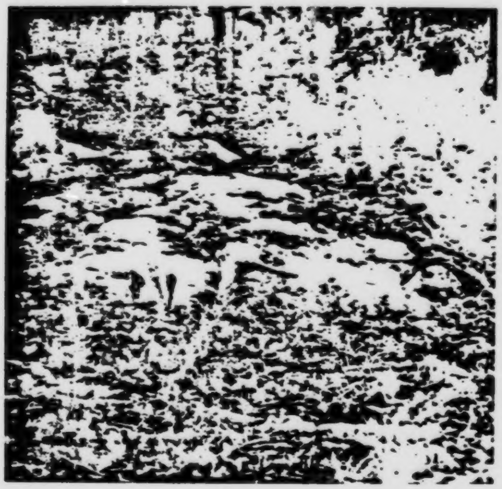
Deleterious Minerals: **Yes** X **No** **Type** Pyrite (chlorite) **Percent** ≤1%

Other Features: Chlorite coated joints; rusty vugs (1-2 cm long); rare quartz veins; pyrite is sparsely disseminated - largest observed concentration was 1 mm diameter

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: The building stone potential of this site is difficult to assess due to poor outcrop exposure. The rock is a medium grained, massive, pink syenite (with <5% fine grained biotite). Jointing is irregular and intense. The presence of quartz veins and sulphides further limits the building stone potential of this site.



General outcrop appearance exhibiting poor exposure. 86-TUD-005

Medium grained, massive, pink syenite. 86-TUD-005

BUILDING STONE INVENTORY

Property No. 86-TUD-006 **Pluton Name** Beaver Creek Complex

Property Name Beaver Creek-3 **Commercial Stone Name** Granite

Geological Rock Name Intrusive Breccia

Township Tudor **Lot** 21 **Con.** 17

NTS 31C/13 **UTM Co-ordinates: Easting** 290300 **Northing** 4964550

Property Status Prospect **Air Photo No.** 78-4456-165-35

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Dark green (matrix) to pink breccia fragments

Weathered Surface Bleached grey-green (matrix) to white (fragments)

Uniform **Variable** X

Weathering Depth: $\leq$ 1/2 cm

Grain Size: Fine-medium (matrix) to fine (fragments) **Uniform** **Variable** X

Texture: Foliated (matrix) to massive (fragments) **Uniform** **Variable** X

Fabric: **Yes** X **No.** **Weak** X **Mod.** **Strong** X **Strike** 075 degrees (variable) **Dip** 85 degrees N

Formed By Shearing

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Matrix: Feldspar (mostly plagioclase) and amphibole with abundant chlorite developed where shearing is most intense. Breccia fragments: Kspar, quartz, rare biotite?

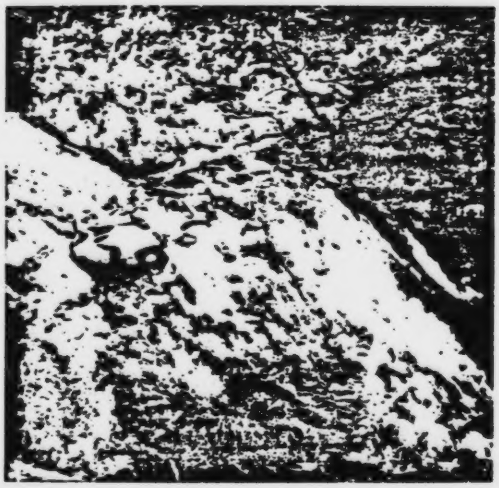
Deleterious Minerals: Yes X **No** **Type** Chlorite **Percent** can be 20-30%

Other Features: Breaks easily due to sheared, often vuggy, character. Difficult to obtain fresh surface - always breaks along rusty coated fractures.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good **Fair** X **Poor**

Comments: Exposure is along steep south facing slope north of access road. Breccia is formed by felsic intrusive fragments (albite syenite according to Lumbers, 1969) hosted by a melanocratic, amphibole and chlorite-rich matrix-sheared diorite? (amphibole-rich albite syenite according to Lumbers, 1969). Felsic fragments can vary considerably in size from centimeters to meters. Breccia is not consistently developed throughout area - local areas are more intensely brecciated and vuggy. Building stone potential is low.



Overall appearance of vuggy, sheared, fairly well exposed, outcrop. 86-TUD-006

Felsic intrusive breccia fragments hosted by sheared mafic intrusive in a shear zone. 86-TUD-006

BUILDING STONE INVENTORY

Property No. 86-TUD-007 **Pluton Name** Beaver Creek Complex

Property Name Beaver Creek-04 **Commercial Stone Name** Granite

Geological Rock Name Felsic Intrusive

Township Tudor **Lot** 18 **Con.** 17

NTS 31C/13 **UTM Co-ordinates: Easting** 291100 **Northing** 4965000

Property Status Prospect **Air Photo No.** 78-4456-165-35

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Bleached pinkish white

Uniform X **Variable**

Weathering Depth: .5 cm

Grain Size: Fine **Uniform** X **Variable**

Texture: Massive-granular **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** **Strike** 055 degrees
Dip 85 degrees S

Formed By Sheared, brecciated marble inclusions

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 020 degrees **Dip** 55 degrees W **Spacing** 0.2 m

B) Strike 020 degrees **Dip** 45 degrees E **Spacing** 0.2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz; Mafics: ≤ 5% local Fe carbonate

Deleterious Minerals: **Yes** X **No** **Type** Fe carbonate **Percent** $\leq 1\%$

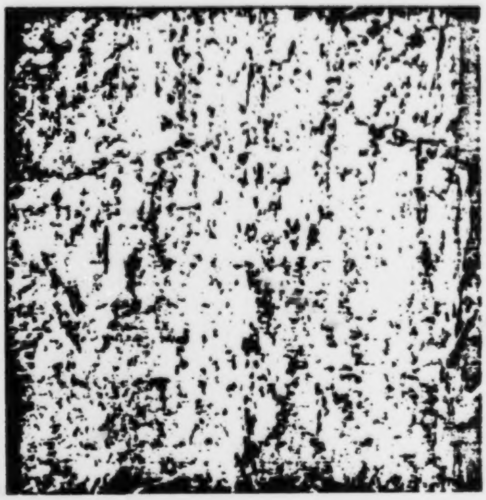
Other Features: Muscovite-coated joints; large (10's of meters in width), sheared, metasedimentary carbonate inclusions nearby

Possible Uses: Limited as building stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: Intense jointing, brecciation, and shearing of the rocks at this site restrict quarry block extraction.

View of massive granular felsic intrusive (granite). 86-TUD-007



Shear zone-felsic intrusive breccia clasts, hosted by sheared, contaminated, marble. 86-TUD-007

BUILDING STONE INVENTORY

Property No. 86-TUD-008 **Pluton Name** Beaver Creek Complex

Property Name Beaver Creek-5 **Commercial Stone Name** Granite

Geological Rock Name Felsic Intrusive

Township Tudor **Lot** 22 **Con.** 17

NTS 31C/13 **UTM Co-ordinates: Easting** 289350 **Northing** 4964350

Property Status Prospect **Air Photo No.** 78-4456-165-35

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface White to pink

Weathered Surface Buff grey

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Fine **Uniform** . **Variable** X

Texture: Massive to foliated **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 105 degrees
Dip 60 degrees S

Formed By (Mineral alignment quartz-feldspar)

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz; Mafics: <2%

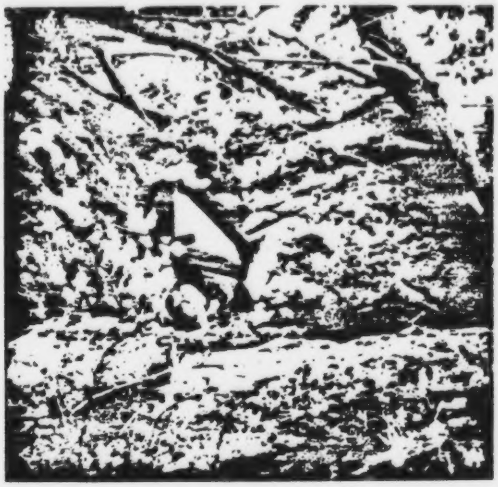
Deleterious Minerals: Yes X **No** **Type** Sulfides **Percent** 1-2%

Other Features: Occasional quartz veins; mm scale Fe carbonate rusty vugs, local shearing; significant variation in local lithologies; some carbonate-coated fractures

Possible Uses: Limited

Outcrop Exposure: Good Fair Poor X

Comments: Quartz veins, carbonate-filled fractures, and local shearing are common at this site. The intense irregular jointing further limits the building stone potential.



View of foliation due to local shearing south of road. 86-TUD-008

Very poor outcrop exposure north of the road. 86-TUD-008

BISHOP CORNERS FORMATION

LOCATION: A CONTINUOUS METASEDIMENTARY FORMATION EXTENDING FROM SOUTHERN BARRIE TOWNSHIP, THROUGH THE WESTERN PART OF KALADAR TOWNSHIP INTO SOUTHEASTERN ELZEVIR TOWNSHIP
NTS 31C/14 OGS MAP #2432, 2053
GEOLOGICAL REPORT #215

SAMPLE SITES: 86-KAL-009

DESCRIPTION OF AREA

The rock sampled is a quartz-pebble conglomerate of the Bishop Corners Formation, a sequence of clastic, silicious metasediments representing the basal unit of the Flinton Group metasediments. The clasts are pebble-size and deformed to flattened, ellipsoidal shapes. Most are grey to white quartzite. The matrix is fine to medium-grained, varying from quartzofeldspathic to micaceous in composition. The matrix is generally schistose with a shiny white to grey colour. Intensity of joint patterns and foliation may be variable throughout the strike length of the formation. However, in the area sampled, the joint pattern is regular and moderate.

CONCLUSIONS

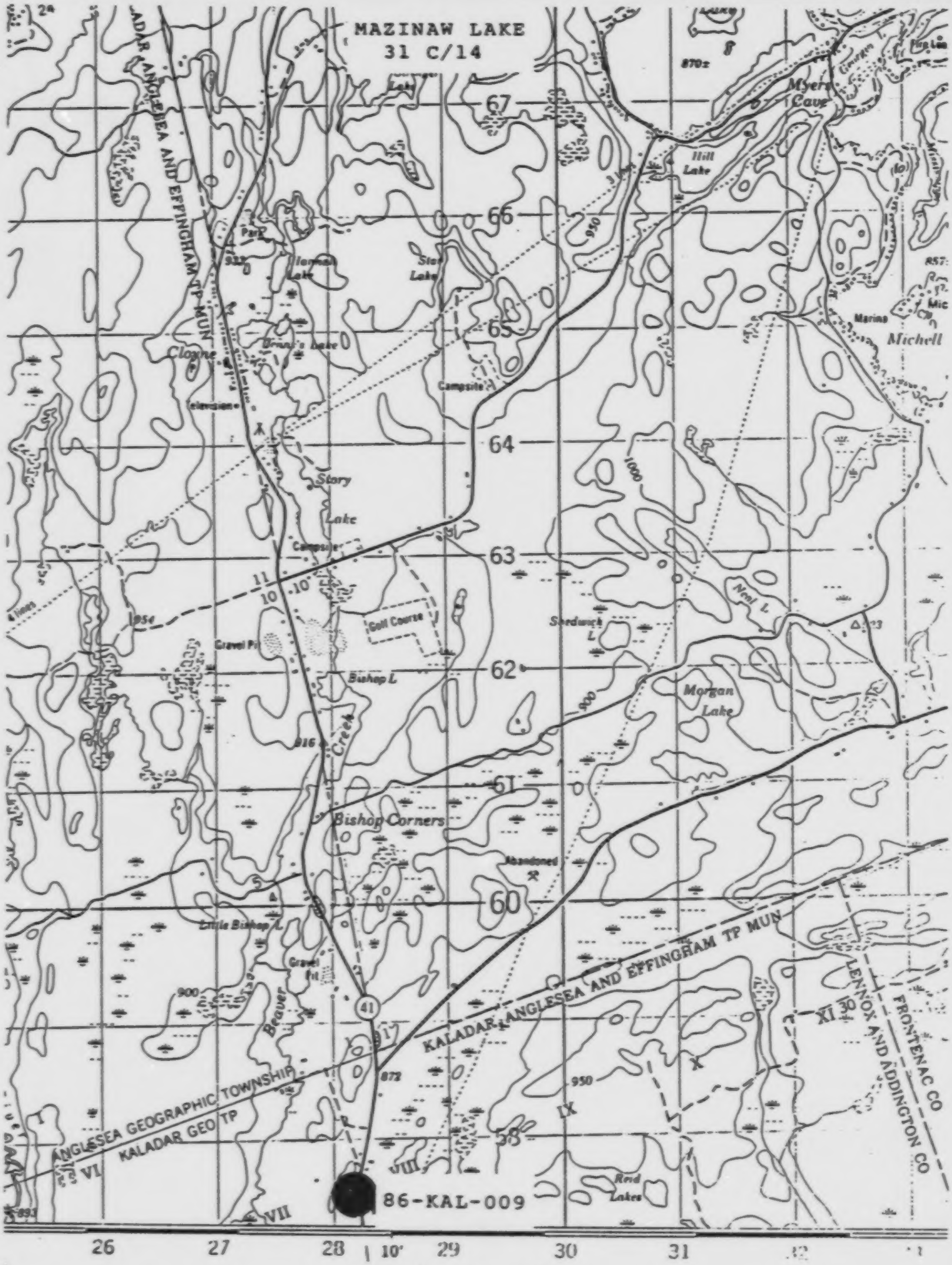
The potential for the removal of small quarry blocks combined with the unique appearance of this rock suggest that further investigation of the area is warranted.

POTENTIAL

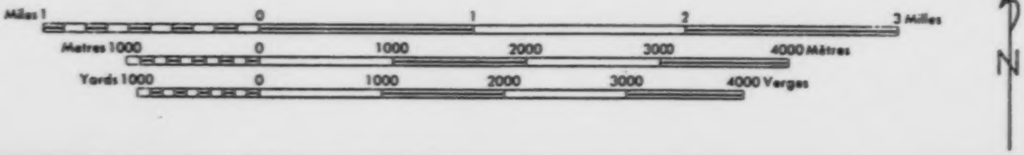
POOR	MODERATE	GOOD
	86-KAL-009	

REFERENCES

Wolff, J.M.
1982: Geology of the Kaladar Area, Frontenac, and Lennox and Addington Counties; Ontario Geological Survey, Report 215, 94p. Accompanied by Map 2432, scale 1:31 680.


MAZINAW LAKE
31 C/14
KALADAR ANGLESEA AND EFFINGHAM TP MUN
Myers Cave
Hill Lake
Star Lake
Brown's Lake
Cloyne
Michell
Story Lake
Campsite
Golf Course
Gravel Pit
Bishop L.
Sedwick L.
Neal L.
Morgan Lake
Creek
Bishop Corners
Abandoned
Little Bishop L.
Beaver
41
KALADAR ANGLESEA AND EFFINGHAM TP MUN
ANGLESEA GEOGRAPHIC TOWNSHIP
KALADAR GEO TP
LENNOX AND ADDINGTON CO
FRONTENAC CO
Reid Lakes
VI
VII
VIII
IX
XI
86-KAL-009
67
66
65
64
63
62
61
60
58
26
27
28
10'
29
30
31
32

Sample Locations
Bishop Corners Formation


Miles 1
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1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-KAL-009 **Pluton Name** Bishop Corners Formation

Property Name Bishop Corners **Commercial Stone Name** Granite

Geological Rock Name Schistose Conglomerate

Township Kaladar **Lot** 30 **Con.** 7 & 8

NTS 31C/14 **UTM Co-ordinates: Easting** 328200 **Northing** 4957500

Property Status Roadcut **Air Photo No.** 78-4452-192-1451

Production History Nil

Use of Explosives: Yes X **No** **Type** High velocity

Colour: Fresh Surface Silver-grey-white

Weathered Surface Silver grey

Uniform **Variable** X

Weathering Depth: Negligible

Grain Size: Large pebbles in fine grained groundmass **Uniform** **Variable** X

Texture: Lineated & foliated **Uniform** **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Lineation & foliation

Bedding: Yes X **No** **Strike** 185 degrees **Dip** 70 degrees S.E. **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 185 degrees **Dip** 70 degrees **Spacing** 1 m

B) Strike 115 degrees **Dip** 80 degrees **Spacing** 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Quartz pebbles, mica

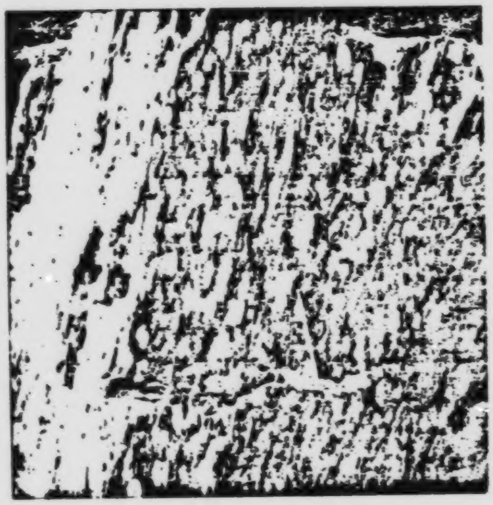
Deleterious Minerals: Yes No X Type Percent

Other Features:

Possible Uses: Architectural stone

Outcrop Exposure: Good Fair X Poor

Comments: This conglomerate shows a definite lineation of quartz pebbles in a fine grained mica groundmass. The mica is foliated and flows around the quartz pebbles giving the rock a very unique boundinage appearance. The jointing appears to be fairly regular and moderate and might facilitate the removal of blocks of 1 m cubed size. Due to blasting along the road, this is difficult to determine for certain. The uniqueness of this stone may encourage further investigation.



Textural view of quartz pebble conglomerate. 86-KAL-009

COE HILL GRANITE

LOCATION: WOLLASTON TWP., SOUTH OF HIGHWAY 620, WEST AND SOUTHWEST OF
WOLLASTON LAKE-COE HILL
NTS 31C/13 OGS MAP #2020
GEOLOGICAL REPORT #11

SAMPLE SITES: 86-WOL-006, 86-WOL-007, 86-WOL-008, 86-WOL-009, 86-WOL-010

DESCRIPTION OF AREA:

Rock samples taken in the Coe Hill Granite are biotite granites in the northern part of the pluton and pink granites to the south. The only notable exception is a diorite sample taken from an inactive quarry in lot 24, concession 5. These rocks tend to be medium grained and massive except around the borders of the pluton where slight foliation was noticed. The colour of the rock tends to be quite uniform near the center of the pluton but near the edges there is a slight variation due to a gneissic foliation.

Jointing in the pluton varies between regular and irregular and is generally moderate with some areas of intense jointing. In areas where horizontal jointing can be seen, it tends to have a spacing of less than half a metre.

Perhaps the most deleterious feature of the pluton as far as building stone is concerned is the presence of quartz veins, pods and stringers throughout much of the area. These quartz features are a limiting factor at the granite quarry (86-WOL-007) that was visited.

The mineralogy of the pluton appears to be mainly quartz, potassium feldspar, plagioclase and biotite.

The southern part of the pluton is characterized by many pegmatite dikes and mafic inclusions which seriously detract from the potential of the area.

CONCLUSIONS

Although this area has been quarried for building stone in the past, it is doubtful that this area has much economic potential at the present time for the removal of large building stone blocks. Some areas may be viable for small scale operations.

POTENTIAL

POOR	MODERATE	GOOD
86-WOL-006	86-WOL-007	
86-WOL-009	86-WOL-008	
	86-WOL-010	

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Hewitt, D.F. and Satterly, J.
1957: Haliburton-Bancroft Area, Province of Ontario; Ontario Department of Mines, Colour Map 1957B, (revised 1972).

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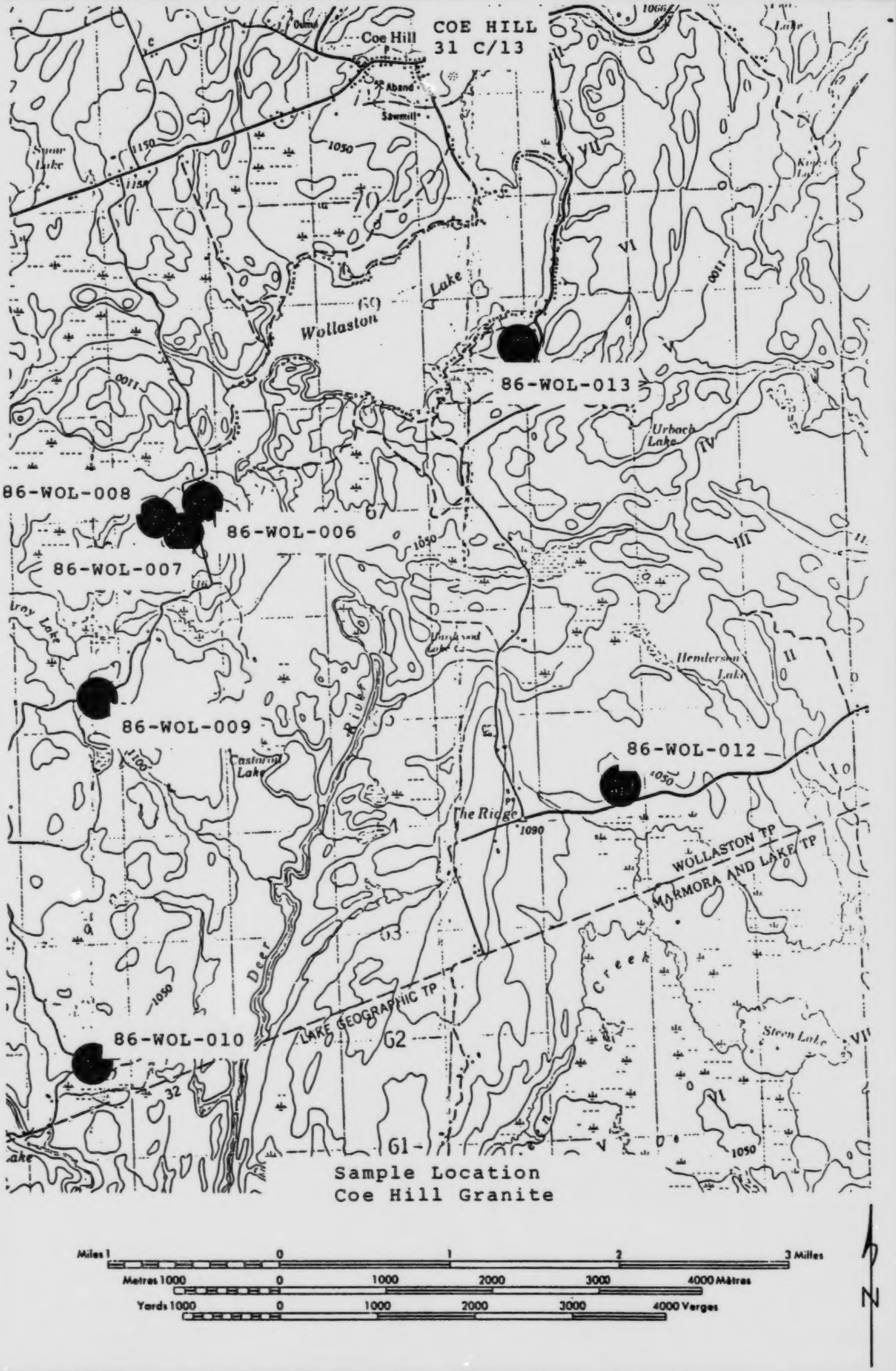

COE HILL
31 C/13
Coe Hill
Aband
Sawmill
Wollaston Lake
Urbach Lake
Henderson Lake
Castor Lake
Deer River
The Ridge
Creek
Steen Lake
WOLLASTON TP
MARMORA AND LAKE TP
LAKE GEOGRAPHIC TP
86-WOL-013
86-WOL-008
86-WOL-006
86-WOL-007
86-WOL-009
86-WOL-012
86-WOL-010
1050
1090
1100
1150
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Location
Coe Hill Granite

BUILDING STONE INVENTORY

Property No. 86-WOL-006 **Pluton Name** Coe Hill Granite

Property Name Wollaston Lake **Commercial Stone Name** Granite

Geological Rock Name Biotite Granite

Township Wollaston **Lot** 22 **Con.** 5

NTS 31C/13 **UTM Co-ordinates: Easting** 373800 **Northing** 4967100

Property Status Prospect **Air Photo No.** 77-4434-9-179

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pinkish brown

Weathered Surface Grey-black

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Medium-fine **Uniform** **Variable** X

Texture: Foliated to gneissic **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod. Strong** X **Strike** 160 degrees **Dip**

Formed By Alignment of biotite grains

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 110 degrees **Dip** Vertical **Spacing** 3 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar quartz biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz veins

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair Poor X

Comments: This site consists of small outcrop exposures of strongly foliated biotite granite. Jointing is moderate in both regular and irregular joint sets. Quartz veins (approximately 2 cm in width) were observed but are not abundant. One regular joint set has a strike of 110 degrees and a vertical dip with spacing of approximately 3 cm. Potential for building stone development in this area is limited.

Outcrop area showing moderate jointing. 86-WOL-006

BUILDING STONE INVENTORY

Property No. 86-WOL-007

Pluton Name Coe Hill Granite

Property Name Granite Quarry

Commercial Stone Name Granite

Geological Rock Name Granite

Township Wollaston **Lot** 24 **Con.** 5

NTS 31C/13 **UTM Co-ordinates: Easting** 373600 **Northing** 4966850

Property Status Inactive **Air Photo No.** 77-4434-9-179

Production History Former granite quarry

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface Pinkish white

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: Regular

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 143 degrees **Dip** Vertical **Spacing** 3 m

B) Strike 80 degrees **Dip** Vertical **Spacing** 3 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, biotite, quartz; Mafic content: approx. 20%

Deleterious Minerals: **Yes** **No X** **Type** **Percent**

Other Features: Outcrop area displays many felsic stringers which detract from the appearance of the outcrop.

Possible Uses: Curbing stone, architectural stone, landscaping stone

Outcrop Exposure: **Good X** **Fair** **Poor**

Comments: This area contains medium grained, massive, pinkish brown granite. The granite was quarried for building stone material in the past. Quarry was abandoned presumably because of the large number of quartz stringers in the rock.

Overall view of quarry exhibiting 2 benches and pinkish-white colour of the granite. 86-WOL-007

Part of grout pile at the quarry site. 86-WOL-007

BUILDING STONE INVENTORY

Property No. 86-WOL-008 **Pluton Name** Coe Hill Granite

Property Name Diorite Quarry **Commercial Stone Name** Granite

Geological Rock Name Diorite-Gabbro

Township Wollaston **Lot** 24 **Con.** 5

NTS 31C/13 **UTM Co-ordinates: Easting** 373450 **Northing** 4566950

Property Status Inactive **Air Photo No.** 77-4434-9-179

Production History Area was quarried for diorite - probably ashlar or small building stone. No further information available at this time.

Use of Explosives: Yes X **No** **Type** Black powder

Colour: Fresh Surface Black

Weathered Surface Brownish black

Uniform X **Variable**

Weathering Depth: 1-5 mm

Grain Size: Fine **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair to poor

Mineralogy: Feldspar; Mafic content: approx. 50%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

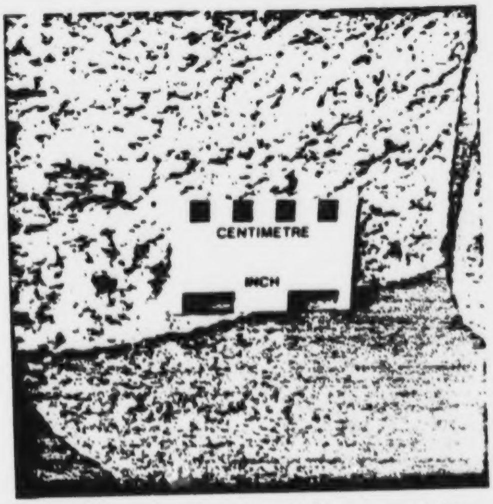
Other Features: Granitic stringers, horizontal sheeting (approximately .5 m spacing)

Possible Uses: Ashlar, monument stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This sample is a massive, medium grained black gabbro or diorite with rare medium grained plagioclase phenocrysts. Felsic stringers were observed but were not abundant. Jointing occurs in moderately intensive, irregular patterns.

Horizontal jointing limits potential block size. 86-WOL-008



Diorite contact with pegmatite. 86-WOL-008

View showing grout pile. 86-WOL-008

BUILDING STONE INVENTORY

Property No. 86-WOL-009 **Pluton Name** Coe Hill Granite

Property Name Gilroy Lake **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Wollaston **Lot** 26,27 **Con.** 4

NTS 31C/13 **UTM Co-ordinates: Easting** 372800 **Northing** 4965300

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: ≤ 1 cm

Grain Size: Fine **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 150 degrees **Dip** 90 degrees **Spacing** ≤ 1 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

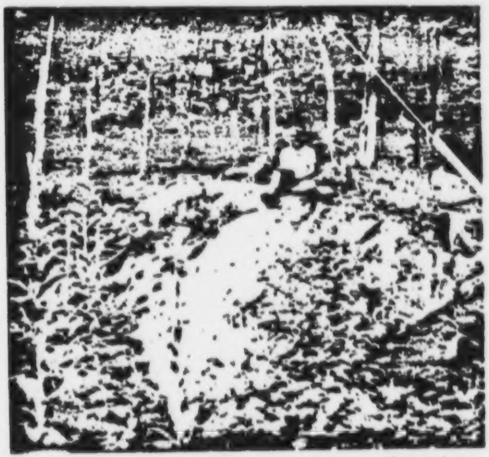
Deleterious Minerals: **Yes** X **No** **Type** Bio schist inclusion **Percent**

Other Features: Quartz stringers, pegmatite dike (5 cm), many mafic inclusions

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a fine grained massive granite. Deleterious feature include a quartz stringer and a pegmatite dike which measures about 5 cm wide. The jointing follows regular and irregular patterns with moderate spacing, however more exposure is needed to determine the true extent of the jointing. Horizontal jointing was not observed. Numerous mafic inclusions were visible on the surface of the outcrop. These factors limit the building stone potential of this area.



Overall view of outcrop showing moderate jointing. 86-WOL-009

Massive, fine-grained, pink granite. 86-WOL-009

Mafic inclusions found in outcrop. 86-WOL-009

BUILDING STONE INVENTORY

Property No. 86-WOL-010 **Pluton Name** Coe Hill Granite

Property Name S.W. Corner of Wollaston Twp. **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Wollaston **Lot** 29,30 **Con.** 1

NTS 31C/13 **UTM Co-ordinates: Easting** 372600 **Northing** 4961900

Property Status Prospect **Air Photo No.** 77-4433-15-201

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink with black

Weathered Surface Grey-pink

Uniform X **Variable**

Weathering Depth: 2-5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Slight foliation **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** **Strike** **Dip**

Formed By Alignment of biotite grains (slight foliation)

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike 100 degrees **Dip** **Spacing** 3 m

B) Strike 40 degrees **Dip** **Spacing** 2 m

C) Strike Horizontal **Dip** **Spacing** <.5 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz biotite; Mafic content: approx. 25-30%

Deleterious Minerals: Yes No X Type Percent

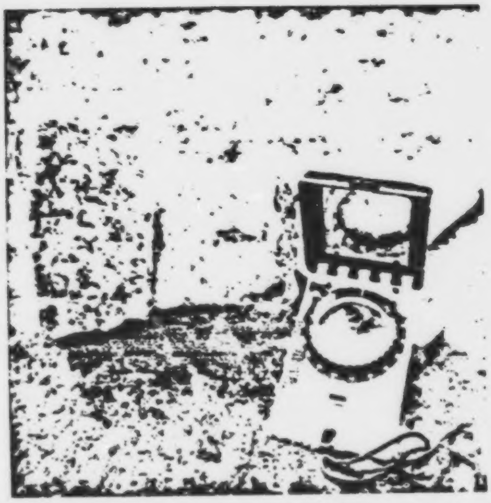
Other Features: Pegmatite dikes, quartz veins, horizontal jointing spaced at less than .5 m, minor exfoliation, aplite dikes observed but rare

Possible Uses: Ashlar, curbing stone, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: This area contains a medium grained pink granite which has a relatively high biotite content, a fact which may hamper its polishing potential .
Jointing occurs in both regular and irregular joint sets with prodominantly moderate intensity. There are numerous pegmatite dikes in the area as well as some aplite dikes and quartz veins. These factors limit the building stone potential of the area.

Fair outcrop exposure along with moderate jointing. 86-WOL-010



Slightly foliated, medium-grained pink and black coloured granite. 86-WOL-010

CORDOVA PLUTON

LOCATION: MARMORA TWP., NORTH OF CROWE LAKE, EAST OF THE HASTINGS-PETERBOROUGH COUNTY BORDER; BETWEEN CORDOVA MINES AND FIDLAR RAPIDS OF BEAVER CREEK
NTS 31C/5, 31C/12 OGS MAP #P.2613
GEOLOGICAL REPORT OFR 5537

SAMPLE SITES: 86-MAR-001, 86-MAR-002, 86-MAR-003, 86-MAR-004, 86-MAR-014, 86-MAR-015

DESCRIPTION OF AREA

The rock type in all six sample areas is gabbroic. All sites show intense jointing, variable grain size, and grey-green to black colour. Deleterious features in addition to jointing include hematite coating, pyrite, granitic stringers, quartz pods, and sheeting.

CONCLUSIONS

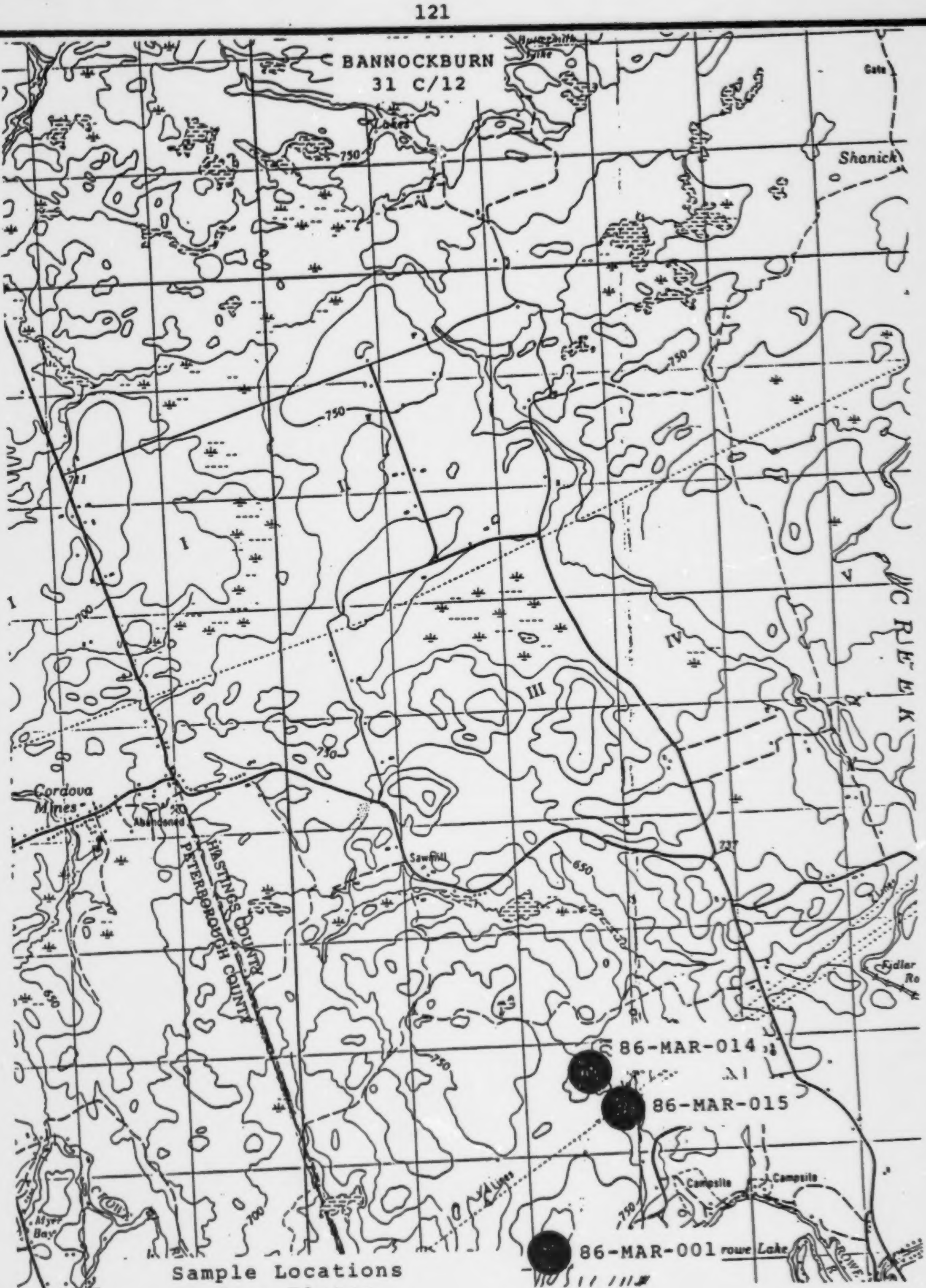
The Cordova Pluton has little potential as a source of building stone.

POTENTIAL

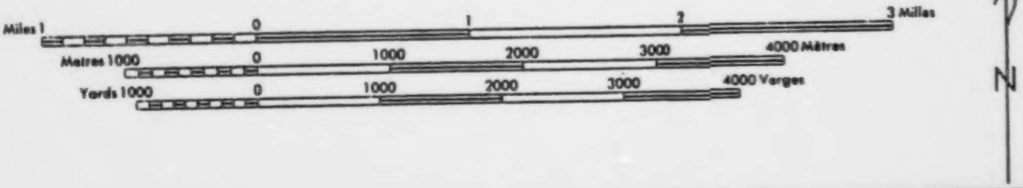
POOR	MODERATE	GOOD
86-MAR-001		
86-MAR-002		
86-MAR-003		
86-MAR-004		
86-MAR-014		
86-MAR-015		

REFERENCES

Bartlett, J.R. and Moore, J.M. Jr.
1985: Geology of Belmont, Marmora, and Southern Methuen Townships, Peterborough and Hastings Counties; OGS Open File Report 5537.


BANNOCKBURN
31 C/12
Gate
Shanick
750
721
700
650
727
I
II
III
IV
V
CREEK
Cordova Mines
Abandoned
HASTINGS COUNTY
PETERBOROUGH COUNTY
Sawmill
Campsite
Campsite
Myer Bay
Crowe Lake
Fidler Rd
86-MAR-014
86-MAR-015
86-MAR-001

Sample Locations
Cordova Pluton
(sheet 1)


Miles 1
0
1
2
3 Miles
Metres 1000
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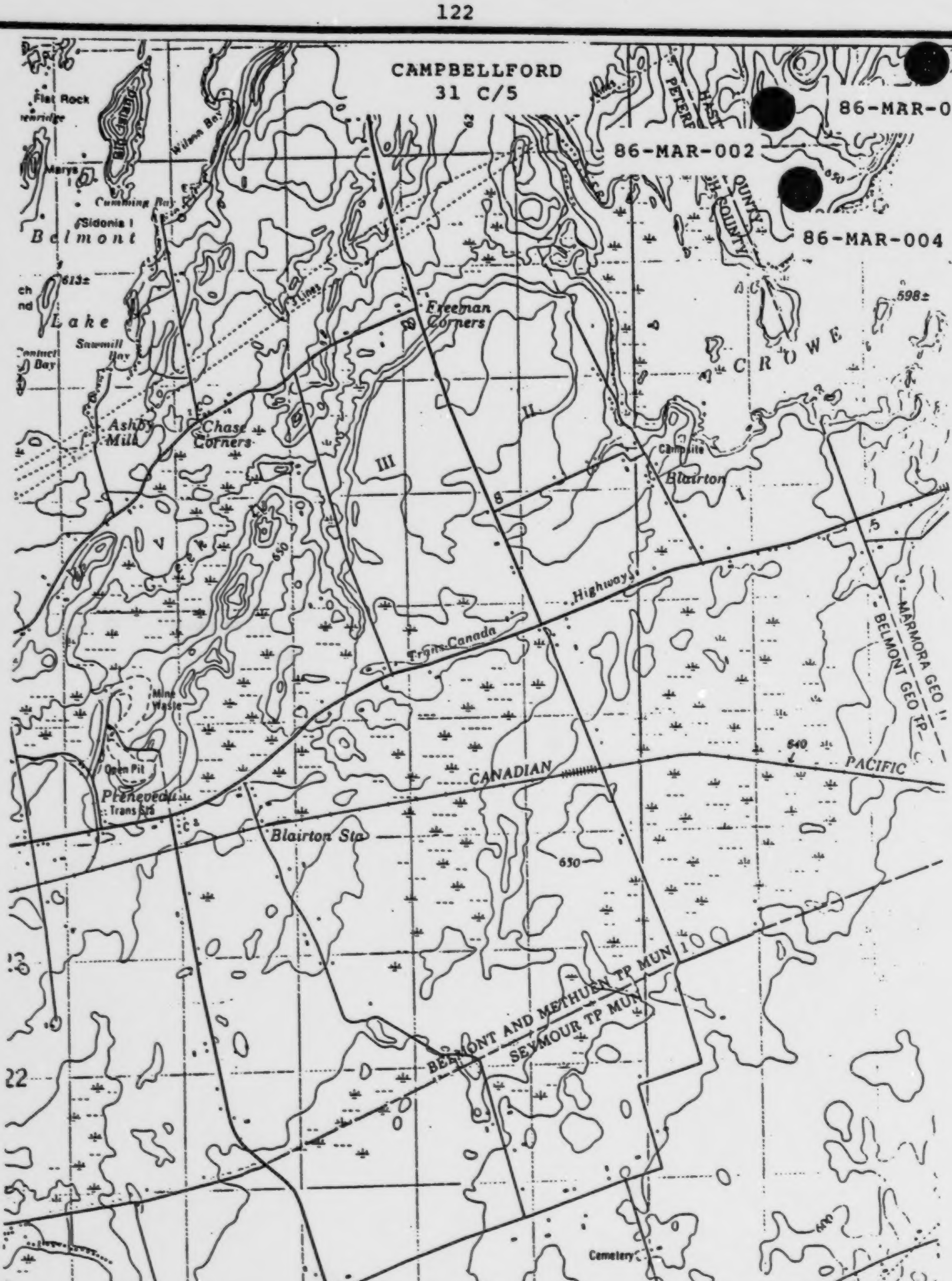
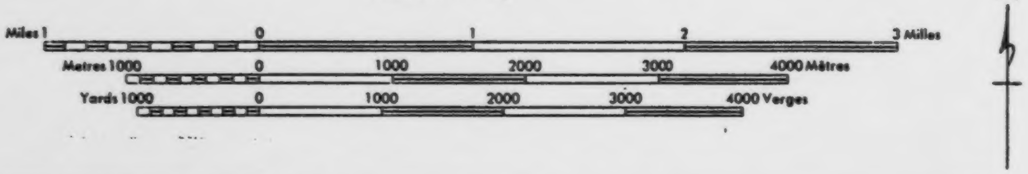
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N


CAMPBELLFORD
31 C/5
86-MAR-002
86-MAR-003
86-MAR-004
Flat Rock
Big Island
Marys
Cumming Bay
Wilson Bay
Sidonia I
Belmont
Lake
Sawmill Bay
Connell Bay
613±
Freeman Corners
Chase Corners
Ashby Mill
CROWE
Campsite
Blairton
598±
III
II
I
V
Highway
Trans-Canada
Mine Waste
Open Pit
Pleneveau
Trans Sta
CANADIAN
PACIFIC
Blairton Sta
MARMORA GEO TP
BELMONT GEO TP
BELMONT AND METHUEN TP MUN
SEYMOUR TP MUN
640
650
630
Cemetery
Silo
23
22
20

Sample Locations
Cordova Pluton
(sheet 2)


Miles 1
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2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-MAR-001 **Pluton Name** Cordova Pluton

Property Name Crowe Lake I **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Marmora **Lot** 12 **Con.** II

NTS 31C/12 **UTM Co-ordinates: Easting** 382100 **Northing** 4931100

Property Status Prospect **Air Photo No.** 78-4435 136-106

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Dark green

Weathered Surface Grey/black

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 160 degrees **Dip** 40 degrees E **Spacing** 1-3 m

B) **Strike** 115 degrees **Dip** vertical **Spacing** 2-3 m

C) **Strike** 85 degrees **Dip** vertical **Spacing** .2-.7 m

D) **Strike** horizontal **Dip** 0 degrees **Spacing** .1-1 m

Potential For Quarry Blocks: Poor

Mineralogy: Pyroxene, feldspar, (chlorite) magnetite

Deleterious Minerals: **Yes** X **No** **Type** Pyrite **Percent** 1%

Other Features: Hematite staining/grain size of pyroxene .5-10 cm/sheeting, magnetite and pyrite are present.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This area is mineralogically heterogeneous with mafic to more felsic phases present. The pyroxene is partially altered to chlorite and the rock contains up to 2% sulfides. Jointing for the most part is intense.

Outcrop exposure is fair to good;
while intensive jointing is present,
it is not evident in the photograph.
86-MAR-001

BUILDING STONE INVENTORY

Property No. 86-MAR-002

Property Name Crowe Lake II

Pluton Name Cordova Pluton

Commercial Stone Name Granite

Geological Rock Name Gabbro

Township Marmora

Lot 11 **Con.** I

NTS 31C/5 **UTM Co-ordinates: Easting** 381300 **Northing** 4930400

Property Status Prospect

Air Photo No. 78-4435-136-106

Production History None

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Greenish-grey

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 2-3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Pyroxene, feldspar, ± carbonate, ± chlorite, locally altered to a calc-silicate

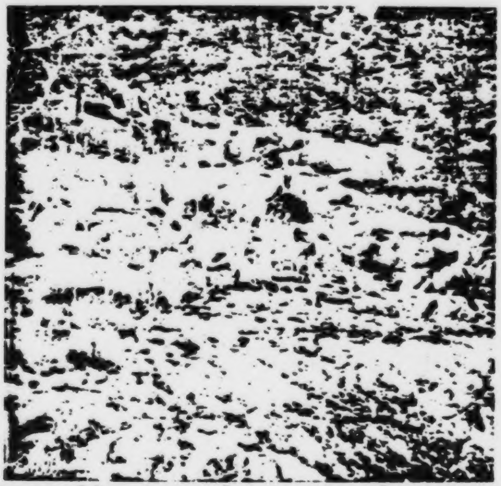
Deleterious Minerals: **Yes** X **No** **Type** Pyrite **Percent** Trace

Other Features: Felsic stringers, 1 m horizontal sheeting

Possible Uses: Ashlar, crushed stone

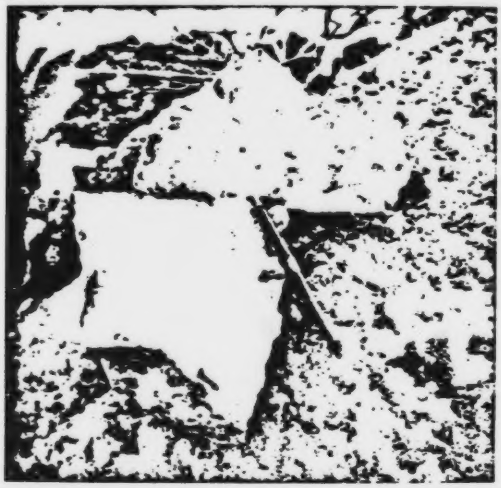
Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: Quarry block extraction is limited by intense jointing.



Overall view of outcrop depicting extensive, irregular jointing. Horizontal sheeting is also evident in this photograph. 86-MAR-002

Overall view of outcrop area showing jointing. 86-MAR-002



Fresh surface depicting texture, colour, and grain size. 86-MAR-002

BUILDING STONE INVENTORY

Property No. 86-MAR-003 **Pluton Name** Cordova Pluton

Property Name Crowe Hill Estates **Commercial Stone Name** Black Granite

Geological Rock Name Pyroxenite

Township Marmora **Lot** 11 **Con.** II

NTS 31C/5 **UTM Co-ordinates: Easting** 382500 **Northing** 4930700

Property Status Prospect **Air Photo No.** 78-4435-136-106

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Green/grey

Weathered Surface Grey/black

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Fine-(medium)-coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 160 degrees **Dip** **Spacing** .1-1 m

B) Strike 70 degrees **Dip** **Spacing** .1-1 m

C) Strike horizontal **Dip** 0 degrees **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Pyroxene, feldspar, chlorite

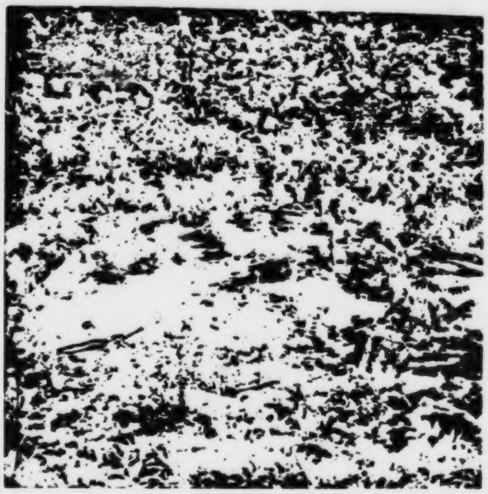
Deleterious Minerals: **Yes** X **No** **Type** Sulphide **Percent** Trace

Other Features: Grain size is very variable, rusting on some surfaces sheeting.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: There is intense jointing in both regular and irregular joint set patterns. Variable grain size is also present at this site.



Overall view of outcrop. The intense jointing mentioned above is not evident here. 86-MAR-003

Fresh surface exhibits colour. Variable grain size is not evident in this sample. 86-MAR-003

BUILDING STONE INVENTORY

Property No. 86-MAR-004 **Pluton Name** Cordova Pluton

Property Name Easton (mailbox) **Commercial Stone Name** Black granite

Geological Rock Name Gabbro

Township Marmora **Lot** 10 **Con.** I

NTS 31C/5 **UTM Co-ordinates: Easting** 381500 **Northing** 4929700

Property Status Prospect **Air Photo No.** 78-4435-136-106

Production History Nil

Use of Explosives: Yes X **No** **Type** For roadwork

Colour: Fresh Surface Dark green

Weathered Surface Grey-green

Uniform X **Variable**

Weathering Depth: .5 cm

Grain Size: Medium to coarse **Uniform** . **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike 120 degrees **Dip** vertical **Spacing** .5-1 m

B) Strike 20 degrees **Dip** vertical **Spacing** 2 m

C) Strike 185 degrees **Dip** 40 degrees E **Spacing** .5-1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Pyroxene, feldspar

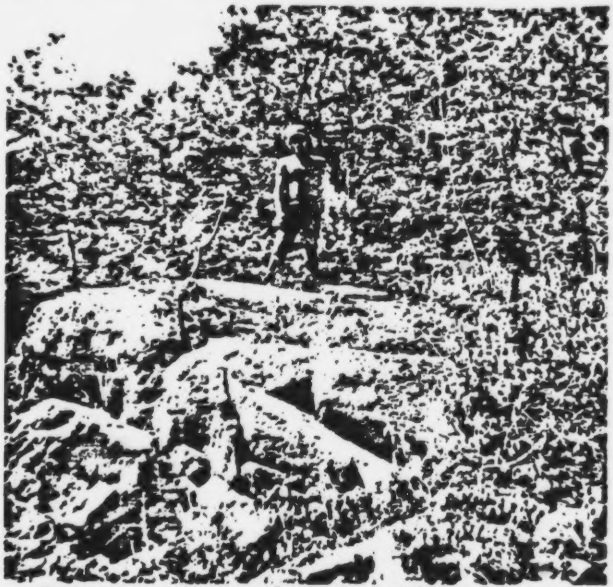
Deleterious Minerals: **Yes** X **No** **Type** Sulfides **Percent** Trace

Other Features: Sulfides produce 1 cm rusty spots.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This is a medium to coarse grained, dark green, gabbro. Intense irregular jointing restricts potential quarry block size.



Intense, irregular jointing is seen in the photo above. 86-MAR-004

BUILDING STONE INVENTORY

Property No. 86-MAR-014 **Pluton Name** Cordova Pluton

Property Name Boundary Road **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Marmora **Lot** 14 **Con.** 2

NTS 31C/12 **UTM Co-ordinates: Easting** 380600 **Northing** 4932650

Property Status Prospect **Air Photo No.** 78-4436-127-134

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Green-grey

Weathered Surface Light grey

Uniform **Variable** X

Weathering Depth: 2-5 mm

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Amphibole, feldspar (quartz)

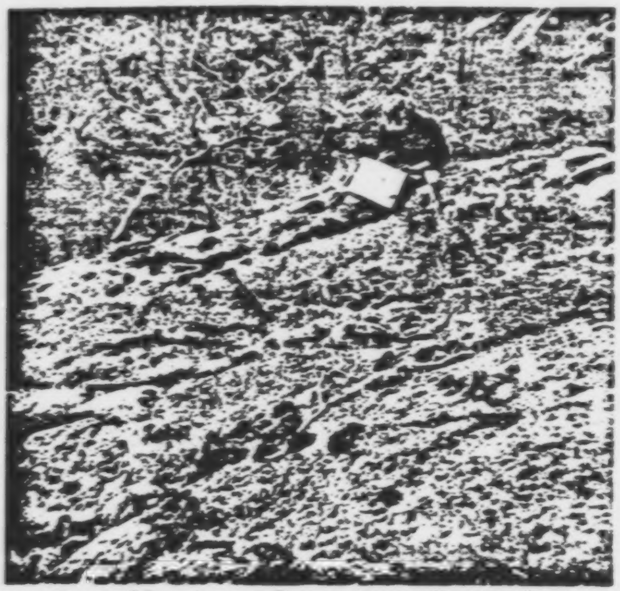
Deleterious Minerals: **Yes** X **No** **Type** Hematite, sulphides **Percent** <3

Other Features: Hornblende phenocrysts, hematite staining & coating

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a medium grained, grey green gabbro. The grain size is variable and amphibole phenocrysts are present. Sulphide inclusions and hematite staining were also observed. Jointing occurs in an intense irregular nature. These factors diminish the building stone potential of this area.



Overall view of outcrop depicting
fair exposure and a light grey
weathering surface. 86-MAR-014

BUILDING STONE INVENTORY

Property No. 86-MAR-015 **Pluton Name** Cordova Pluton

Property Name Hydroline **Commercial Stone Name** Black Granite

Geological Rock Name Pyroxenite

Township Marmora **Lot** 12 & 13 **Con.** II

NTS 31C/12 **UTM Co-ordinates: Easting** 382820 **Northing** 4932450

Property Status Prospect **Air Photo No.** 78-4436-127-137

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Green-black

Weathered Surface Dark grey-green-white

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** **Dip** **Spacing**

B) **Strike** **Dip** **Spacing**

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Pyroxene, feldspar (chlorite)

Deleterious Minerals: Yes X **No** **Type** Hematite **Percent** ≤55%

Other Features: Aplite dyke in quartz pods, felsic stringers, felsic phases

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good X **Fair** **Poor**

Comments: This rock is a coarse grained, chloritized pyroxenite. It contains numerous felsic stringers and pods and is intensely jointed in both regular and irregular joint patterns. The grain size is variable on an outcrop scale. These factors reduce the building stone potential of this rock.

Overall view of entire outcrop. Note extensive jointing. 86-MAR-015

Photo of part of the outcrop showing intense jointing and sheeting. Note hammer for scale. 86-MAR-015

CROW LAKE PLUTON

LOCATION: WEST-CENTRAL SOUTH CROSBY TOWNSHIP, EXTENDING INTO EASTERN
STORRINGTON TOWNSHIP, FROM SOUTH OF CROW LAKE TO SAND LAKE
NTS 31C/9 OGS MAP #P.2611
GEOLOGICAL REPORT GSC BULLETIN 199

SAMPLE SITES: 86-SCRO-001

DESCRIPTION OF AREA

The Crow Lake pluton consists of two northeast-trending bodies with foliations conformable to the surrounding gneisses. The central parts are composed of pyroxene monzonite grading to hornblende-biotite granite at the margins. Magnetite, ilmenite, specular hematite, and pyrite occur throughout the monzonite (Currie and Ermanovics, 1971).

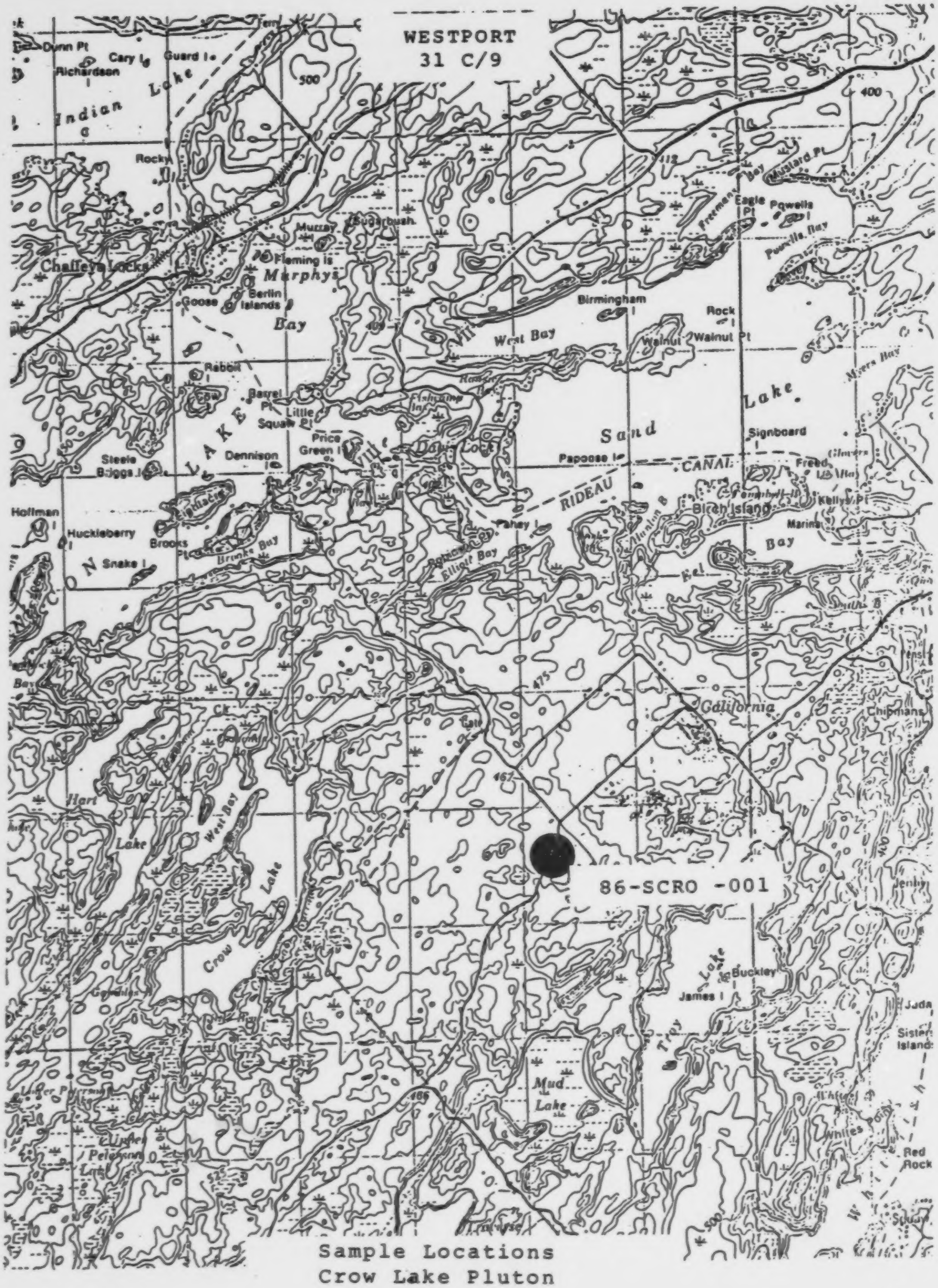
Outcrops at sample site 86-SCRO-001 show irregular, intense jointing as well as hematite staining and trace pyrite.

POTENTIAL

POOR	MODERATE	GOOD
86-SCRO-001		

REFERENCES

Currie, K.L. and Ermanovics, I.F.
1971: Geology of the Loughborough Lake Region, Ontario, With Special Emphasis on the Origin of the Granitoid Rocks -- A Contribution to the Syenite Problem; Geological Survey of Canada, Bulletin 199.


WESTPORT
31 C/9
86-SCRO -001
Dunn Pt
Cary Is
Guard I.
Richardson I
Indian Lake
Rocky
Chaffeys Locks
Murray
Sugarbush
Fleming Is
Murphys Bay
Goose
Berlin Islands
Birmingham I
Rock I
Walnut I
Walnut Pt
West Bay
Rabbit I
Beaver Pt
Little Squaw Pt
Price
Green I
Dennison I
Steele
Briggs I
Sand Lake
Signboard
Papoose I
RIDEAU CANAL
Birch Island
Kellys Pt
Freeman Bay
Eagle Pt
Powells I
Powells Bay
Mustard Pt
Myers Bay
Hoffman I
Huckleberry I
Brooks
Snake I
Fahey I
Elliott Bay
Bay
Indian Lake
California
Chipmans
Hart Lake
West Bay
Crow Lake
Buckley
James I
Troy Lake
Mud Lake
Sisters Islands
Red Rock
400
500
475
467
486
525
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Crow Lake Pluton

BUILDING STONE INVENTORY

Property No. 86-S.CRO-001 **Pluton Name** Crow Lake Pluton

Property Name California **Commercial Stone Name** Granite

Geological Rock Name Quartz monzonite

Township South Crosby **Lot** 7 **Con.** 9

NTS 31C/9 **UTM Co-ordinates: Easting** 398300 **Northing** 4931550

Property Status Prospect **Air Photo No.** 78-4437 124-154

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brown

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated-porphyritic **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Foliation

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 080 degrees **Dip** 090 degrees **Spacing** .5 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz

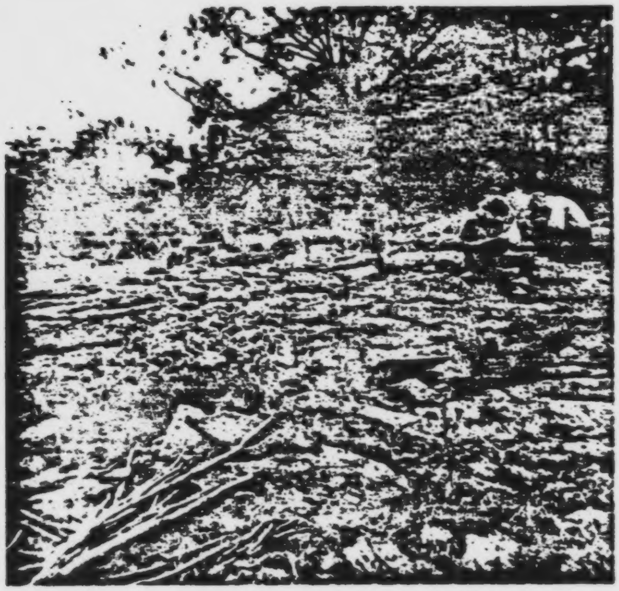
Deleterious Minerals: Yes X **No** **Type** Sulphides **Percent** Trace

Other Features: Hematite coating on joint faces, trace sulphides observed, plagioclase megacrysts abundant (1 cm)

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good **Fair** X **Poor**

Comments: This rock is a medium grained, moderately foliated brown quartz monzonite. It contains abundant plagioclase megacrysts. Intensive jointing is characteristic of this site.



Overall view of outcrop exhibiting extensive jointing. 86-S.CRO-001

Fresh surface shows colour, grain size and texture of outcrop. 86-S.CRO-001

DELORO PLUTON

LOCATION: WEST-CENTRAL MADOC TOWNSHIP AND EAST-CENTRAL MARMORA TOWNSHIP,
BETWEEN HWY. 7 AND THE MOIRA RIVER
NTS 31C/12, 31C/5 OGS MAP #2154, P.2613
GEOLOGICAL REPORT 73 OFR 5537

SAMPLE SITES: 86-MAR-005 to 86-MAR-013 inclusive; 86-MAD-002 to 86-MAD-007 inclusive; 86-MAD-010

DESCRIPTION OF AREA

The Deloro Pluton is about 10 km long and 6 km wide. It consists of three facies, the dominant type being pink, medium to coarse-grained perthite granite. Along the western margin, in Marmora township, is a syenitic phase and in the eastern part is a fine to medium-grained granophyric granite (Hewitt, 1968). The granite is generally quite massive, lacking foliation or lineation, and some of the areas examined exhibit limited jointing favourable for quarry operations.

CONCLUSIONS

The southwestern part of the Deloro Pluton, in Marmora township, shows moderate to good potential for building stone. Other parts may warrant further examination, but access problems within the pluton limit the potential for development to the marginal area.

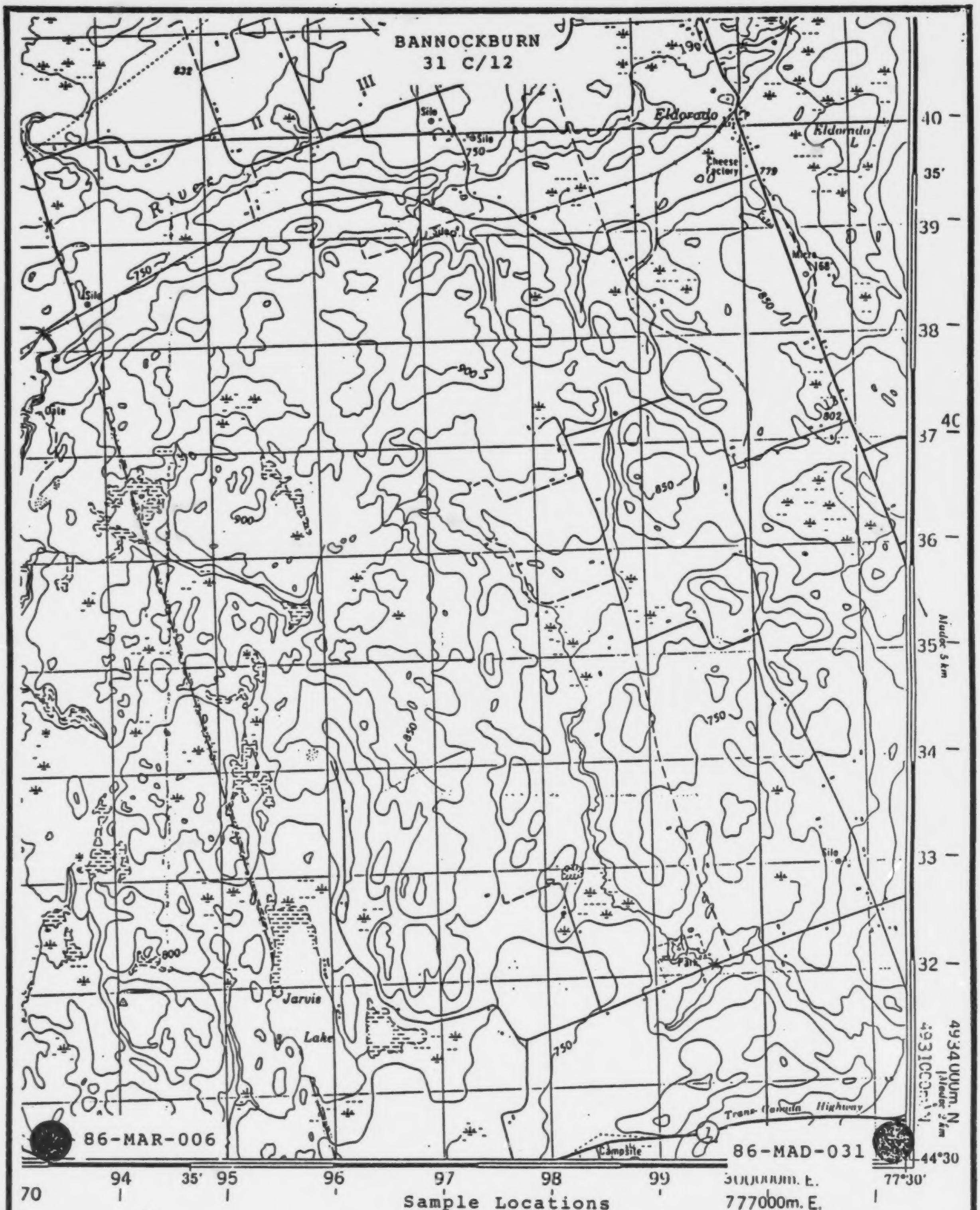
POTENTIAL

POOR	MODERATE		GOOD
86-MAR-005			
86-MAR-006			
		86-MAR-007	
			86-MAR-008
	86-MAR-009		
		86-MAR-010	
	86-MAR-011		
86-MAR-012			
	86-MAR-013		
86-MAD-002			
86-MAD-003			
86-MAD-004			
86-MAD-005			
86-MAD-006			
86-MAD-007			
	86-MAD-010		

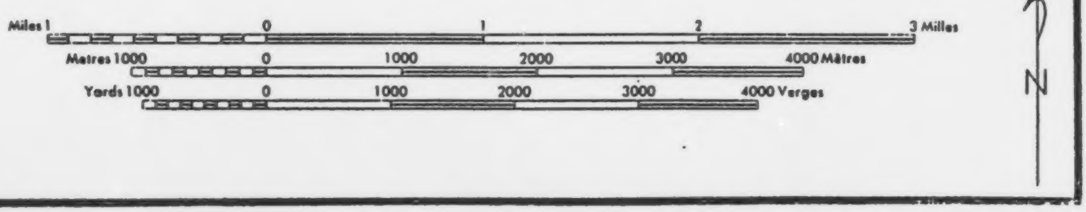
REFERENCES

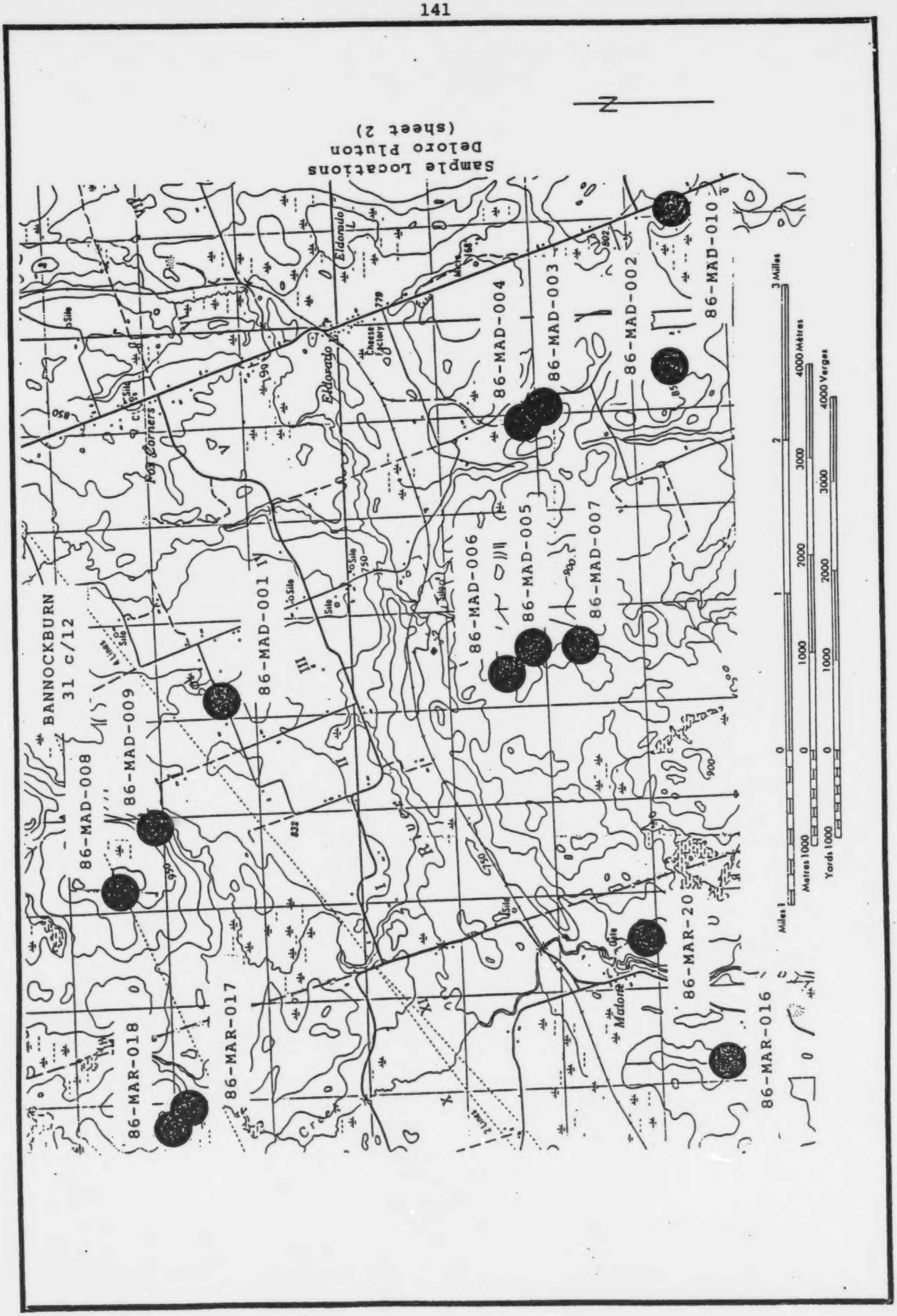
Barlett, J.R. and Moore, J.M. Jr.
1985: Geology of Belmont, Marmora, and Southern Methuen Townships, Peterborough and Hastings Counties; OGS Open File Report 5537.

Hewitt, D.F.
1968: Geology of Madoc Township and the North Part of Huntingdon Township, Hastings County; ODM Geological Report 73.


BANNOCKBURN
31 C/12
Eldorado
Eldorado L
Cheese Factory
Silo
Jarvis
Lake
Park
Campsite
Trans Canada Highway
750
800
850
900
86-MAR-006
86-MAD-031
40
39
38
37
36
35
34
33
32
35'
94
35'
95
96
97
98
99
70
300000m. E.
777000m. E.
77°30'
44°30
4934000m. N
4931000m. N

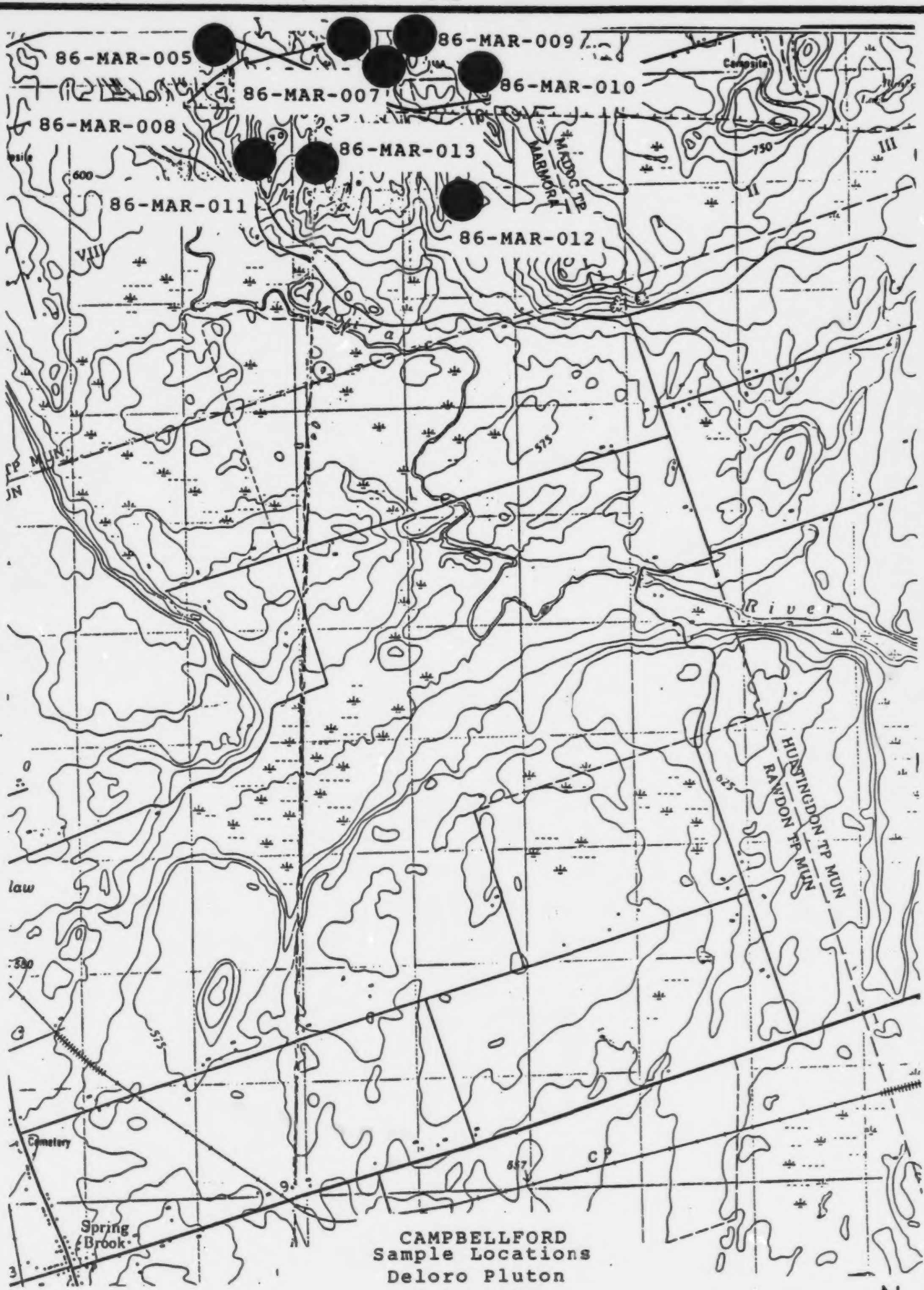
Sample Locations
Deloro Pluton
(sheet 1)


Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N



Sample Locations
Deloro Pluton
(sheet 2)

N
BANNOCKBURN
31 C/12
86-MAD-001
86-MAD-002
86-MAD-003
86-MAD-004
86-MAD-005
86-MAD-006
86-MAD-007
86-MAD-008
86-MAD-009
86-MAD-010
86-MAR-016
86-MAR-017
86-MAR-018
86-MAR-20
Fox Corners
Eldorado
Eldorado L
Cheese Factory
Malone
River
Creek
Silo
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges


86-MAR-005
86-MAR-009
86-MAR-007
86-MAR-010
86-MAR-008
86-MAR-013
86-MAR-011
86-MAR-012
MADOC TP
MARMORA
750
600
VIII
II
III
TP MUN
575
River
625
HUNTINGDON TP MUN
RAWDON TP MUN
law
550
575
Cemetery
557
CP
Spring Brook
N
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges

CAMPBELLFORD
Sample Locations
Deloro Pluton
(sheet 3)

BUILDING STONE INVENTORY

Property No. 86-MAR-005 **Pluton Name** Deloro Pluton

Property Name Mar. South of #7 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Marmora **Lot** 6 **Con.** IX

NTS 31C/5 **UTM Co-ordinates: Easting** 393300 **Northing** 4930350

Property Status Prospect **Air Photo No.** 78-4435-136-117

Production History Nil

Use of Explosives: Yes **No** X **Type** Explosives used on a roadcut to the north

Colour: Fresh Surface Pink-brown

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 65 degrees **Dip** vertical **Spacing** .1-1 m

B) **Strike** 120 degrees **Dip** vertical **Spacing** .1-1 m

C) **Strike** 175 degrees **Dip** vertical **Spacing** 1-2 m

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole

Deleterious Minerals: Yes No X **Type** **Percent**

Other Features: Quartz veining, exfoliation, some hematite staining

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good X **Fair** **Poor**

Comments: This rock is a pinkish brown, medium grained granite. The outcrop exposure is good however jointing is extensive.

Overall view of outcrop area showing extensive jointing. 86-MAR-005

BUILDING STONE INVENTORY

Property No. 86-MAR-006

Pluton Name Deloro Pluton

Property Name Hydrocut

Commercial Stone Name Granite

Geological Rock Name Granite (Amphibole perthite)

Township Marmora

Lot 6 **Con.** IX

NTS 31C/12 **UTM Co-ordinates: Easting** 393325 **Northing** 4930500

Property Status Prospect

Air Photo No. 78-4435-126-117

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pinkish-brown

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 60 degrees **Dip** vertical **Spacing** .1-1 m

B) Strike 140 degrees **Dip** vertical **Spacing** 1-3 m

C) Strike horizontal **Dip** 0 degrees **Spacing** up to 1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Some minor exfoliation - 1 m benches seen, some mafic knots.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a medium grained, pinkish brown granite. This site is similar to other areas of the Deloro Pluton in that the outcrop exposure is extensive and the jointing is generally irregular and intensive. Minor exfoliation and rare mafic inclusions were observed.

Note extensive outcrop exposure depicting irregular, intensive, jointing. 86-MAR-006

BUILDING STONE INVENTORY

Property No. 86-MAR-007 **Pluton Name** Deloro Pluton

Property Name Jarvis Lake S.W. **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Marmora **Lot** 5 **Con.** 10

NTS 31C/5 **UTM Co-ordinates: Easting** 394800 **Northing** 4930170

Property Status Prospect **Air Photo No.** 78-4435-136-119

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Dark pink

Uniform X **Variable**

Weathering Depth: .5-1.5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing X to **Moderate Jointing** X **Intensive Jointing**

A) Strike 180 degrees **Dip** ? **Spacing** .5-2 m

B) Strike 120 degrees **Dip** ? **Spacing** 1-2 m

C) Strike 5 degrees **Dip** 10 degrees W **Spacing** .2 to 1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Good to fair

Mineralogy: K-spar, quartz, minor amphibole

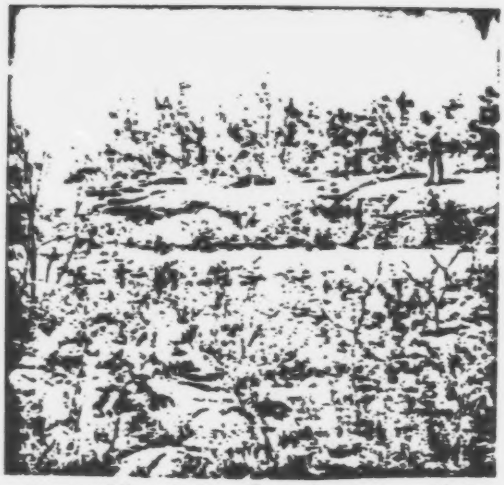
Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

Other Features: Rare aplite dikes 10 cm - 3 cm, rare quartz veins (1 cm - 5 cm)

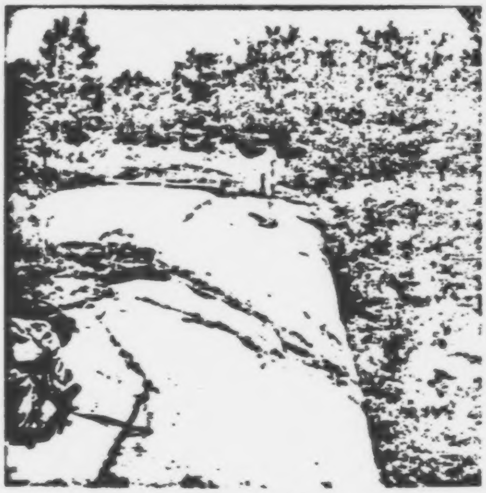
Possible Uses: Architectural stone, structural stone, landscaping stone, ashlar

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: Regular joint sets are spaced at 1-3 m intervals and are dissected by poorly defined irregular but generally widely spaced joints. Quartz veining and aplite stringers are not abundant. Subhorizontal sheeting is spaced at .5 to 1.5 m. This area warrants further evaluation.



Overall view of outcrop. Note good exposure along with 1 m - 2 m horizontal benches. 86-MAR-007



North view along the top of a bench. Jointing is limited to moderate. 86-MAR-007

BUILDING STONE INVENTORY

Property No. 86-MAR-008 **Pluton Name** Deloro Pluton

Property Name Jarvis Lake S.W. #2 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Marmora **Lot** N 1/2 5, S 1/2 6 **Con.** 10

NTS 31C/5-31C/12 **UTM Co-ordinates: Easting** 394450 **Northing** 4930400

Property Status Prospect **Air Photo No.** 78-4435-136-119

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink (light)

Uniform X **Variable**

Weathering Depth: .1-1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing X **Moderate Jointing** X **Intensive Jointing**

A) Strike 170 degrees **Dip** vertical **Spacing** 1-3 m avg. 1.5

B) Strike 80 degrees **Dip** vertical **Spacing** 1-4 m avg. 1 m

C) Strike horizontal **Dip** 0 degrees **Spacing** 1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Good

Mineralogy: Amphibole, quartz, k-spar

Deleterious Minerals: Yes X No Type **Percent** Trace

Other Features: Irregular hematite staining

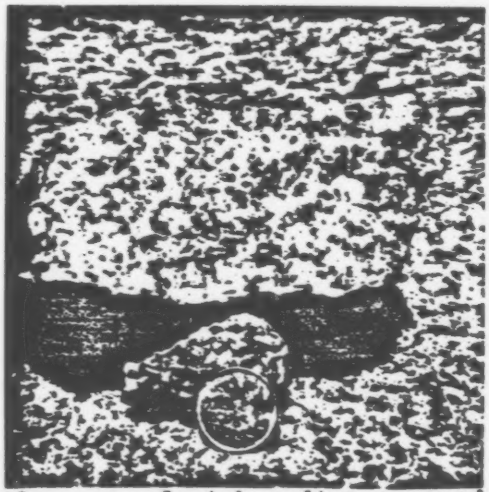
Possible Uses: Architectural stone, landscaping stone, structural stone

Outcrop Exposure: Good X Fair Poor

Comments: Area looks favourable for the removal of some large quarry blocks, however horizontal jointing may be a limiting factor. Some surface exfoliation is noted at the 2 cm scale. Area should be further investigated.

Good outcrop exposure along with limited to moderate jointing noted in the photograph above. 86-MAR-008

View depicting 1 m high bench, possibly horizontal jointing. 86-MAR-008



Close-up of pink medium grained granite. 86-MAR-008

BUILDING STONE INVENTORY

Property No. 86-MAR-009 **Pluton Name** Deloro Pluton

Property Name Moira River East **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Marmora **Lot** 5 **Con.** E 1/2 X

NTS 31C/5 **UTM Co-ordinates: Easting** 395170 **Northing** 4930400

Property Status Prospect **Air Photo No.** 78-4435-136-119

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** Minor

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 125 degrees **Dip** vertical **Spacing** .5-2 m Avg. 1 m

B) Strike horizontal **Dip** 0 degrees **Spacing** 1-2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, quartz, amphibole

Deleterious Minerals: Yes No X **Type** **Percent**

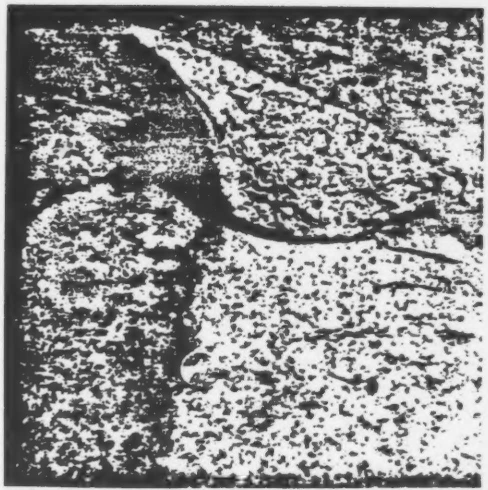
Other Features: Rare hematite staining.

Possible Uses: Architectural stone, landscaping stone

Outcrop Exposure: Good X Fair Poor

Comments: This rock is a medium grained massive pink granite. Jointing is predominantly of a regular repeating nature with moderate spacing and vertical dips. Exfoliation is on the 0.3 m scale.

Moderate, regular jointing is seen in the photograph above. 86-MAR-009


Close-up of light pink weathered surface. 86-MAR-009

4 m high scarp along north edge of outcrop with 8 m blocks (average) severed from it. 86-MAR-009

BUILDING STONE INVENTORY

Property No. 86-MAR-010

Pluton Name Deloro Pluton

Property Name Marmora-Madoc Borderline

Commercial Stone Name Granite

Geological Rock Name Granite

Township Marmora

Lot 4 **Con.** 11

NTS 31C/5 **UTM Co-ordinates: Easting** 395700 **Northing** 4930100

Property Status Prospect

Air Photo No. 78-4435 136-119

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pinkish brown

Weathered Surface Pink-grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** (X)

Limited Jointing X **Moderate Jointing** (X) **Intensive Jointing**

A) Strike 080 degrees **Dip** **Spacing** 2 m

B) Strike 140 degrees **Dip** **Spacing** 2 m

C) Strike 035 degrees **Dip** 090 degrees **Spacing** .5-2 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair to good

Mineralogy: Quartz, biotite, potassium feldspar, hornblende

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

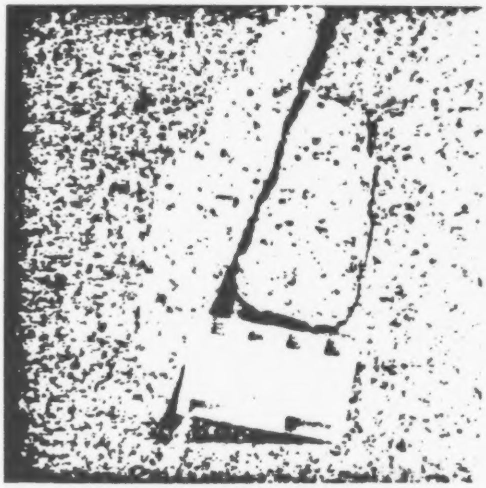
Other Features: Some minor exfoliation, benches up to 1 1/2 m, rare quartz pods, hematite patches

Possible Uses: Monument stone, building stone, ashlar, structural stone, landscaping stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: Outcrop shows fair to good potential for large quarry block extraction. Irregular hematite staining and rare quartz pods are present. This area warrants further evaluation.

Overall view of outcrop exhibiting limited to moderate jointing along with good exposure. 86-MAR-010



Pinkish brown, uniform, medium grained granite. 86-MAR-010

BUILDING STONE INVENTORY

Property No. 86-MAR-011 **Pluton Name** Deloro Pluton

Property Name Moira River **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Marmora **Lot** 4 **Con.** 9

NTS 31C/5 **UTM Co-ordinates: Easting** 393700 **Northing** 4929250

Property Status Prospect **Air Photo No.** 79-4434-137-87

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink-brown

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: ≤ 3/4 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 90 degrees **Dip** **Spacing** 1-5 m

B) Strike 45 degrees **Dip** **Spacing** 2-3 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, quartz, biotite, hornblende

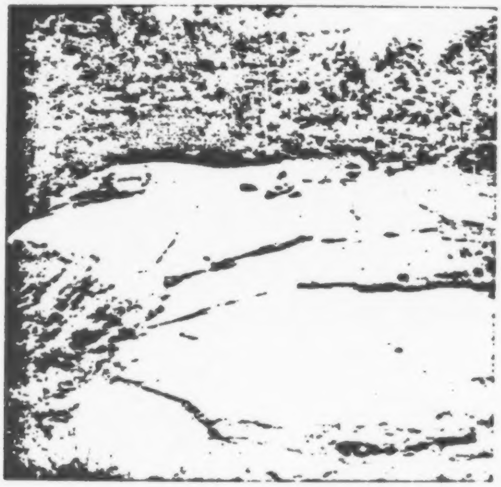
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Some minor surface exfoliation, 1 quartz stringer noticed extensive hematite staining, mafic inclusions (on the 2 cm scale).

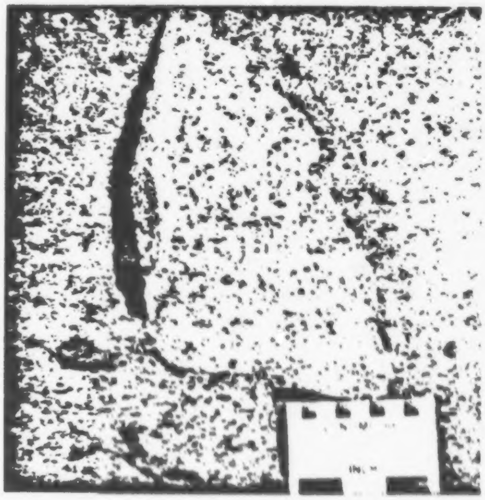
Possible Uses: architectural stone, landscaping stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: Vertical jointing is predominantly of a regularly repeating nature of moderate intensity. Exfoliation was also observed. Quartz stringers and hematite staining are other features which further diminish building stone potential.



Moderate jointing and good outcrop exposure is evident at this particular locality. 86-MAR-011



The fresh surface exhibits a pink-brown colour, medium grain size, and massive texture. 86-MAR-011

BUILDING STONE INVENTORY

Property No. 86-MAR-012 **Pluton Name** Deloro Pluton

Property Name Moira River **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Marmora **Lot** 3 **Con.** 10

NTS 31C/5 **UTM Co-ordinates: Easting** 394450 **Northing** 4928900

Property Status Prospect **Air Photo No.** 78-4434-137-87

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish-brown

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: ≤ 2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) **Strike** 30 degrees **Dip** 90 degrees **Spacing** 1-2 m

B) **Strike** 115 degrees **Dip** 90 degrees **Spacing** 1-2 m

C) **Strike** 170 degrees **Dip** 90 degrees **Spacing** 2 m

horizontal D) **Strike** **Dip** **Spacing** < 1 m

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, hornblende, biotite

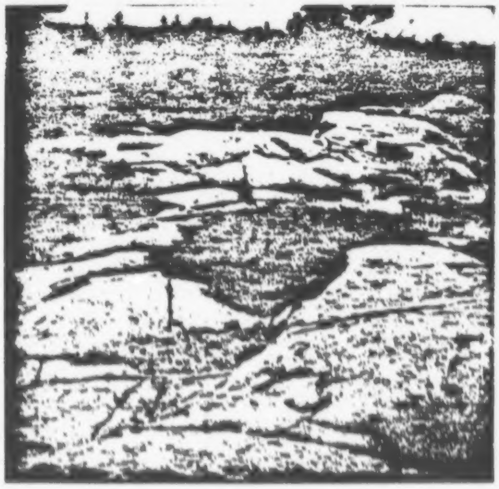
Deleterious Minerals: **Yes** X **No** **Type** Hematite **Percent** Trace

Other Features: Quartz veining, specularite coating, < 1 m horizontal sheeting.

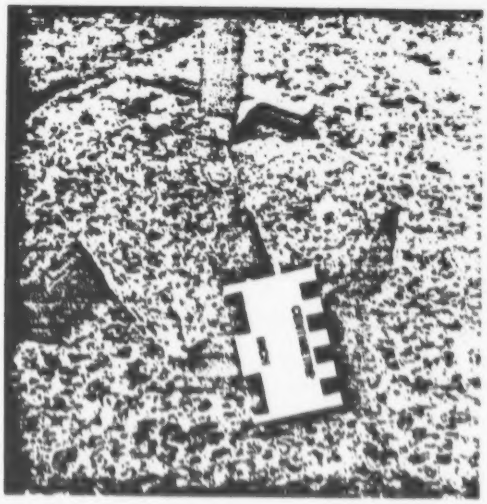
Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a massive, medium grained granite. The colour is reddish brown and has a very fresh appearance. The outcrop exposure is extensive however deleterious features diminish the building stone potential of this rock. These features include regular and irregular joint patterns (joint frequency ranging from moderate to intensive), quartz veining and hematite staining.



Overall view of moderate to intensely jointed outcrop area.
86-MAR-012



Close-up of reddish brown, medium-grained, massive textured granite.
86-MAR-012

BUILDING STONE INVENTORY

Property No. 86-MAR-013 **Pluton Name** Deloro Pluton

Property Name Marmora North **Commercial Stone Name** Granite

Geological Rock Name Granite (biotite)

Township Marmora **Lot** 4 **Con.** 9

NTS 31C/5 **UTM Co-ordinates: Easting** 394250 **Northing** 4929200

Property Status Prospect **Air Photo No.** 78-4434-137-87

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Reddish brown

Weathered Surface Pinkish-white

Uniform X **Variable**

Weathering Depth: <2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern**

Limited Jointing X **Moderate Jointing** **Intensive Jointing**

A) **Strike** 115 degrees **Dip** 90 degrees **Spacing** .5-3 m

B) **Strike** 140 degrees **Dip** 90 degrees **Spacing** 1 m

C) **Strike** 60 degrees **Dip** 90 degrees **Spacing** 3 m

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, quartz, hornblende

Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

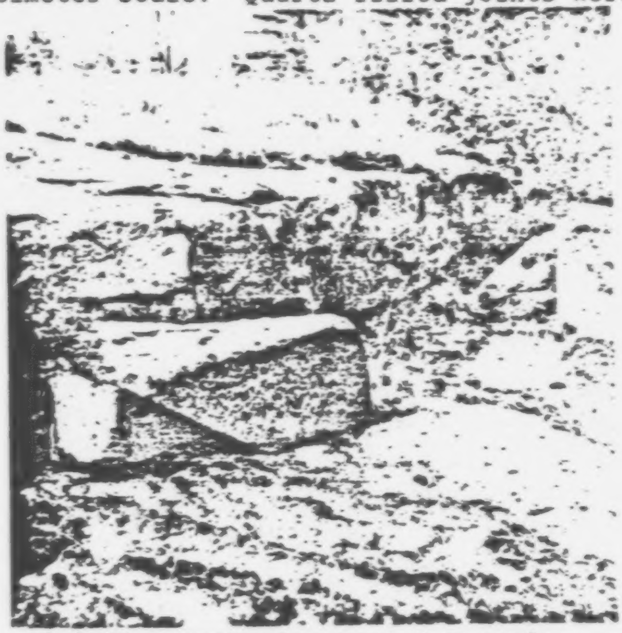
Other Features: Filled joints (cm scale sheeting)

Possible Uses: Architectural stone, landscaping stone

Outcrop Exposure: **Good** **X** **Fair** **Poor**

Comments: This rock is a massive, medium grained, reddish brown granite with few deleterious features with respect to building stone requirements. Limited regular vertical joint sets occur primarily in 3 orientations with spacing averaging about 1 meter. Horizontal jointing also occurs on the 1 meter scale but exfoliation was observed on the centimeter scale. Quartz filled joints were also observed.

Overall view of outcrop showing limited jointing and good exposure. 86-MAR-013



Jointing occurring on a 1 m scale. 86-MAR-013

BUILDING STONE INVENTORY

Property No. 86-MAD-002 **Pluton Name** Deloro Pluton

Property Name Hematite Road #2 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Madoc **Lot** 12 **Con.** 4

NTS 31C/12 **UTM Co-ordinates: Easting** 299420 **Northing** 4936600

Property Status Prospect **Air Photo No.** 78-4439-132-80,81

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Reddish-brown

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 0.5 to 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole

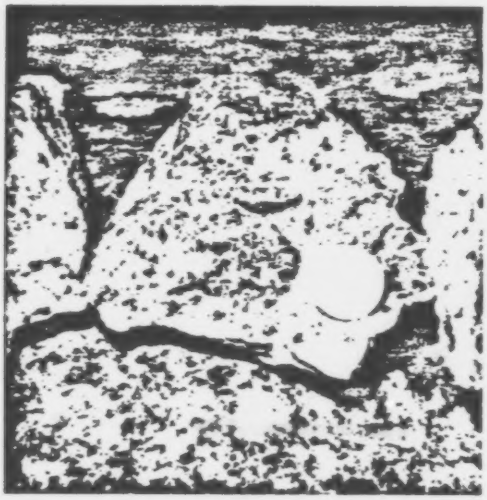
Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

Other Features: Horizontal sheeting (on the 10 cm scale)

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This is a medium grained, reddish-brown granite of the Deloro Pluton (eastern margin). This outcrop has more amphibole than was observed further to the east. The rock has a very good colour and is very competent. Unfortunately, the intense irregular fractures limit the potential for building stone development.



Reddish-brown, medium grained,
massive granite. 86-MAD-002

BUILDING STONE INVENTORY

Property No. 86-MAD-003 **Pluton Name** Deloro Pluton

Property Name Nelson **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Madoc **Lot** 14 **Con.** 4

NTS 31C/12 **UTM Co-ordinates: Easting** 299090 **Northing** 4937900

Property Status Prospect **Air Photo No.** 78-4439-132-79,80

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish-brown

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 0.5 to 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, plagioclase, quartz, amphibole

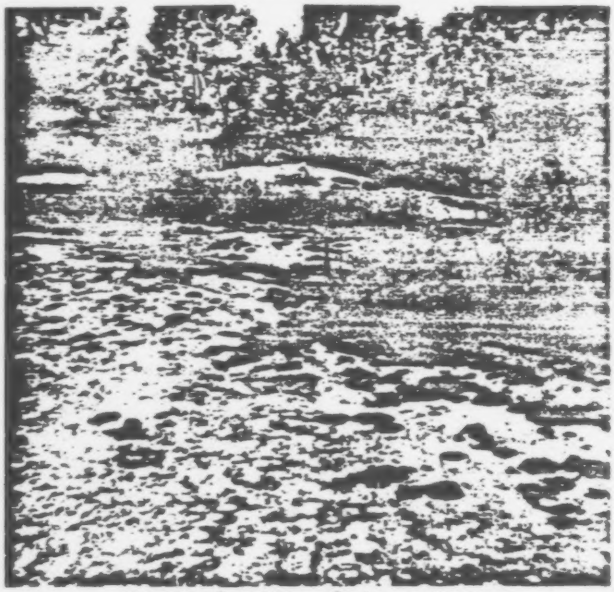
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veins (1-2 cm width), rare quartz pods (1 ft. X 0.5 ft.)

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is medium grained, equigranular with a reddish-brown colour. Quartz veins and pods are present in minor amounts; however, intense jointing limits the building stone potential.



View showing fair outcrop exposure. 86-MAD-003

BUILDING STONE INVENTORY

Property No. 86-MAD-004 **Pluton Name** Deloro Pluton

Property Name Nelson's **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Madoc **Lot** 15 **Con.** 4

NTS 31C/12 **UTM Co-ordinates: Easting** 298950 **Northing** 4938150

Property Status Prospect **Air Photo No.** 78-4440-191-96

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink-brown

Weathered Surface Light pink-grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 10 degrees **Dip** vertical **Spacing** 1 to 2 m

B) Strike horizontal **Dip** **Spacing** .3 m

C) Strike 100 degrees **Dip** vertical **Spacing** .3 to 1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, amphibole, quartz, plagioclase

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veins; 5 mm width

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: The rock from this outcrop is a pink brown granite of uniform colour and medium grain size. The outcrop is part of the eastern edge of the Deloro Pluton and shows intense irregular jointing and moderate regular jointing. Vertical jointing and intense horizontal sheeting (.3 m) in this outcrop indicate low potential for quarry blocks.

Overall view of outcrop showing a regular pattern of moderate to intense jointing. 86-MAD-004

BUILDING STONE INVENTORY

Property No. 86-MAD-005 **Pluton Name** Deloro Pluton

Property Name Forestry Road **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Madoc **Lot** 15 **Con.** 2

NTS 31C/12 **UTM Co-ordinates: Easting** 296600 **Northing** 4939150

Property Status Prospect **Air Photo No.** 78-4439-132-76,77

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink-brown

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole

Deleterious Minerals: Yes **No** X **Type** **Percent**

Other Features: Extreme jointing

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good **Fair** **Poor** X

Comments: This rock is a competent, pink-brown, medium grained granite from the north east portion of the Deloro Pluton. Outcrop exposure is extremely poor and jointing is irregular and intense. These factors diminish building stone potential for this site.

BUILDING STONE INVENTORY

Property No. 86-MAD-006 **Pluton Name** Deloro Pluton

Property Name Eldorado West **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Madoc **Lot** 16 **Con.** 2

NTS 31C/12 **UTM Co-ordinates: Easting** 296350 **Northing** 4938430

Property Status Prospect **Air Photo No.** 78-4440-191-94

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish brown

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 cm to 15 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 44 degrees **Dip** **Spacing** 0.3 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, plagioclase, quartz, amphibole

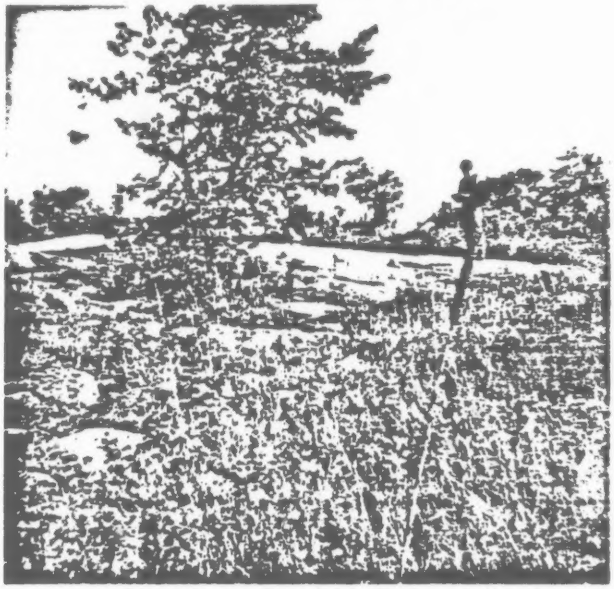
Deleterious Minerals: Yes No X Type Percent

Other Features: Rare quartz veins (1 cm width). Horizontal sheeting closely spaced - 0.1 to 0.5 meters

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: This rock is a reddish brown, medium grained, massive granite. The closely spaced horizontal sheeting, inaccessibility and poor outcrop exposure diminish the building stone potential of this rock.



Overall view showing fair outcrop exposure. 86-MAD-006

BUILDING STONE INVENTORY

Property No. 86-MAD-007 **Pluton Name** Deloro Pluton

Property Name Hunting Shack **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Madoc **Lot** 14 **Con.** 2

NTS 31C/12 **UTM Co-ordinates: Easting** 296600 **Northing** 4937650

Property Status Prospect **Air Photo No.** 78-4440-191-94

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish-brown

Weathered Surface Light pink to grey

Uniform X **Variable**

Weathering Depth:

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole

Deleterious Minerals: Yes X **No** **Type** Sulphides **Percent** <1%

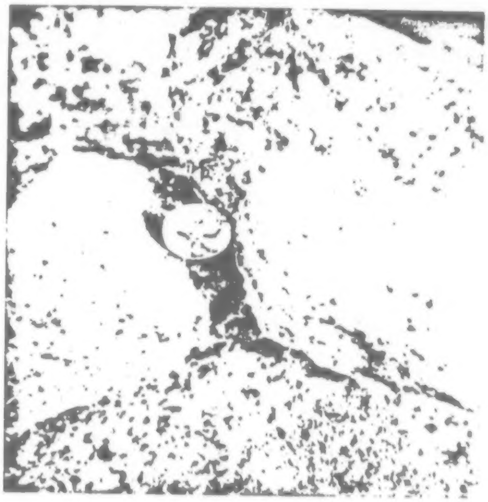
Other Features: Amphibole shows signs of alteration, aplite dikes (rare)

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good **Fair** X **Poor**

Comments: Despite the fact that this site is closer to the pluton interior than other sites of the Deloro Pluton, intense irregular jointing is still the predominant factor which limits this site's potential for building stone development. The grain size was observed to be variable in certain areas of this exposure. Rare aplite dikes were also observed.

Overall view of outcrop area exhibiting fair to good exposure. 86-MAD-007



Close-up of reddish-brown, medium grained granite. 86-MAD-007

BUILDING STONE INVENTORY

Property No. 86-MAD-010 **Pluton Name** Deloro pluton

Property Name Hazzards Corners Road **Commercial Stone Name** Granite

Geological Rock Name Red granite

Township Madoc **Lot** 11 NE 1/4 **Con.** 5

NTS 31C/12 **UTM Co-ordinates: Easting** 301100 **Northing** 4936500

Property Status Inactive **Air Photo No.** 78-4439-132-84,85

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 35 degrees **Dip** Vertical **Spacing** .5 m

B) Strike 80 degrees **Dip** Vertical **Spacing** .5 m

C) Strike 160 degrees **Dip** Vertical **Spacing** 1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: K-spar, quartz, biotite, hornblende

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Some horizontal jointing .5 m spacing, hematite staining, some quartz veining.

Possible Uses: Ornamental stone, paving stone, ashlar, curbing stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This red granite is not particularly attractive and would be unsuited for a quarry operation due to irregular jointing pattern. The rock is a medium grained, massive, leucocratic granite. Some limited quartz veining and hematite staining were noted.

Overall view of outcrop exposure. Note vertical and horizontal jointing. 86-MAD-010

ELZEVIR BATHOLITH

LOCATION: MOST OF ELZEVIR TOWNSHIP AND THE NORTH-WEST CORNER OF KALADAR TOWNSHIP
NTS 31C/11 OGS MAP 51D
GEOLOGICAL REPORT AR51, PT. 4

SAMPLE SITES: 86-KAL-001, 86-KAL-002, 86-KAL-004, 86-KAL-005, 86-ELZ-001, 86-ELZ-002, 86-ELZ-003, 86-ELZ-004, 86-ELZ-005, 86-ELZ-006, 86-ELZ-007, 86-ELZ-008, 86-ELZ-009

DESCRIPTION OF AREA

Rock types observed within the Elzevir Batholith consist predominantly of feldspar (mostly plagioclase, occasionally K-spar) quartz and biotite and include the following:

1. Massive (sometimes weakly foliated), white, medium-grained granodiorite eg. (ELZ-002A, 004, 009, KAL-002)
2. Well-foliated, grey, fine-grained granodiorite eg. (ELZ-002B, 005, 006, 007)

Rock type (1) probably has best potential for use as building stone. Rock type (2) may have some application as monument stone due to its darker colour and fine-grained character but there is a possibility that considerable variation occurs in this unit. The darker colour may be attributed to higher mafic mineral content (more biotite) which would result in a less competent rock that may tend to localize deformation. Differing degrees of deformation or mafic mineral content would create variable colour and texture. Volumetrically rock type (1) is obviously more significant than rock type (2).

For most outcrops, moderate to intense jointing appears to be the limiting factor (ie. difficult to delineate joint-free areas large enough to produce quarry blocks). In some areas, abundance of mafic inclusions, felsic stringers/dikes and/or quartz veining becomes important, but these features are usually accompanied by intense jointing.

Central portions of the intrusion offer little or no access along with difficult terrain (predominantly swamp). Although the intrusive core should generally produce more desirable massive textures and less jointing limited exposure and access indicate further investigation is not warranted.

Examination of the Northern portion of the intrusion was not successful due to poor access. Hydro line exposures delineated by air photo inspection occur just north of McKnight Lake in Grimsthorpe Twp. (Lots 11, 12, Conc. I) and west of Slave Lake in Anglesea Twp. (Lots 20, 21, Conc III, IV). Suggested access for the Grimsthorpe exposure is through Cooper from the west and for the Anglesea exposure, through Cloyne, from the east.

Further examination of the SE margins of Elzevir Batholith is recommended (Lots 6, 7, 8, Conc. X and Lots 8, 9, 10, 11, Conc. XI - as per Osbourne, 1930); in particular, lots 8, 9, Conc. XI due to immediate proximity to 86-ELZ-004, the best prospect identified to date in the Elzevir Batholith. Systematic detailed ground coverage may be warranted in the area of 86-ELZ-004.

Also recommended for investigation is Lot 6, Conc. V (after Parks, 1912).

Another area of good exposure delineated by air inspection is Lot 20, Conc. III along Queensborough Creek. Access is from Concession Road IV.

CONCLUSION

In general, building stone potential in the Elzevir Batholith appears poor due to reasons given (jointing, inclusions, quartz, veins, etc.). Most areas would only be suitable for ashlar, paving stone, landscaping stone, or rubble which alone do not justify a quarry operation. The large joint-free areas of 86-ELZ-004 identify the potential for quarry blocks along the SE margin as an exception.

POTENTIAL

POOR		MODERATE	GOOD
	86-KAL-001		
	86-KAL-002		
86-KAL004			
	86-KAL-005		
86-ELZ-001			
86-ELZ-002			
	86-ELZ-003		
		86-ELZ-004	
86-ELZ-005			
	86-ELZ-006		
	86-ELZ-007		
	86-ELZ-008		
	86-ELZ-009		

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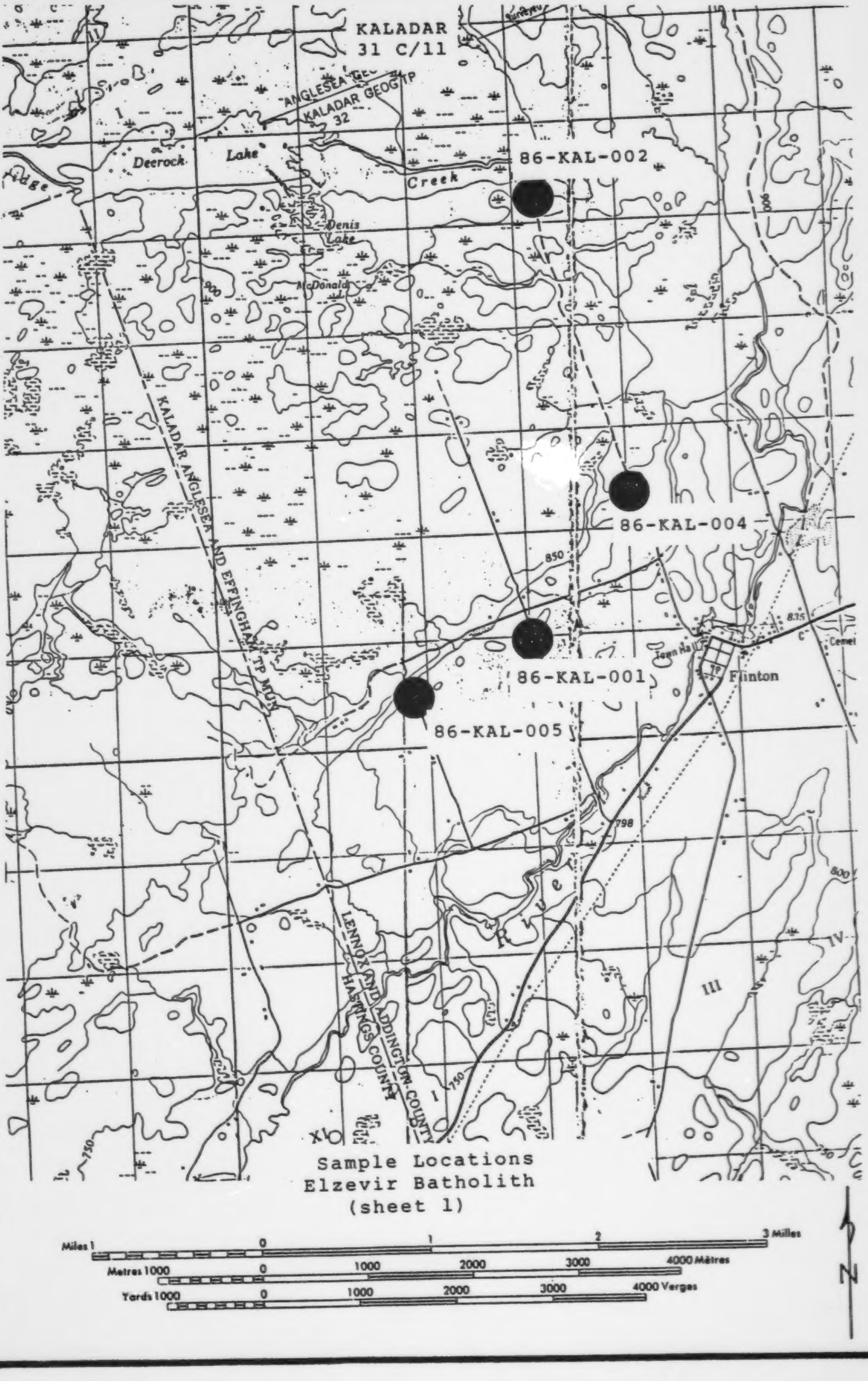
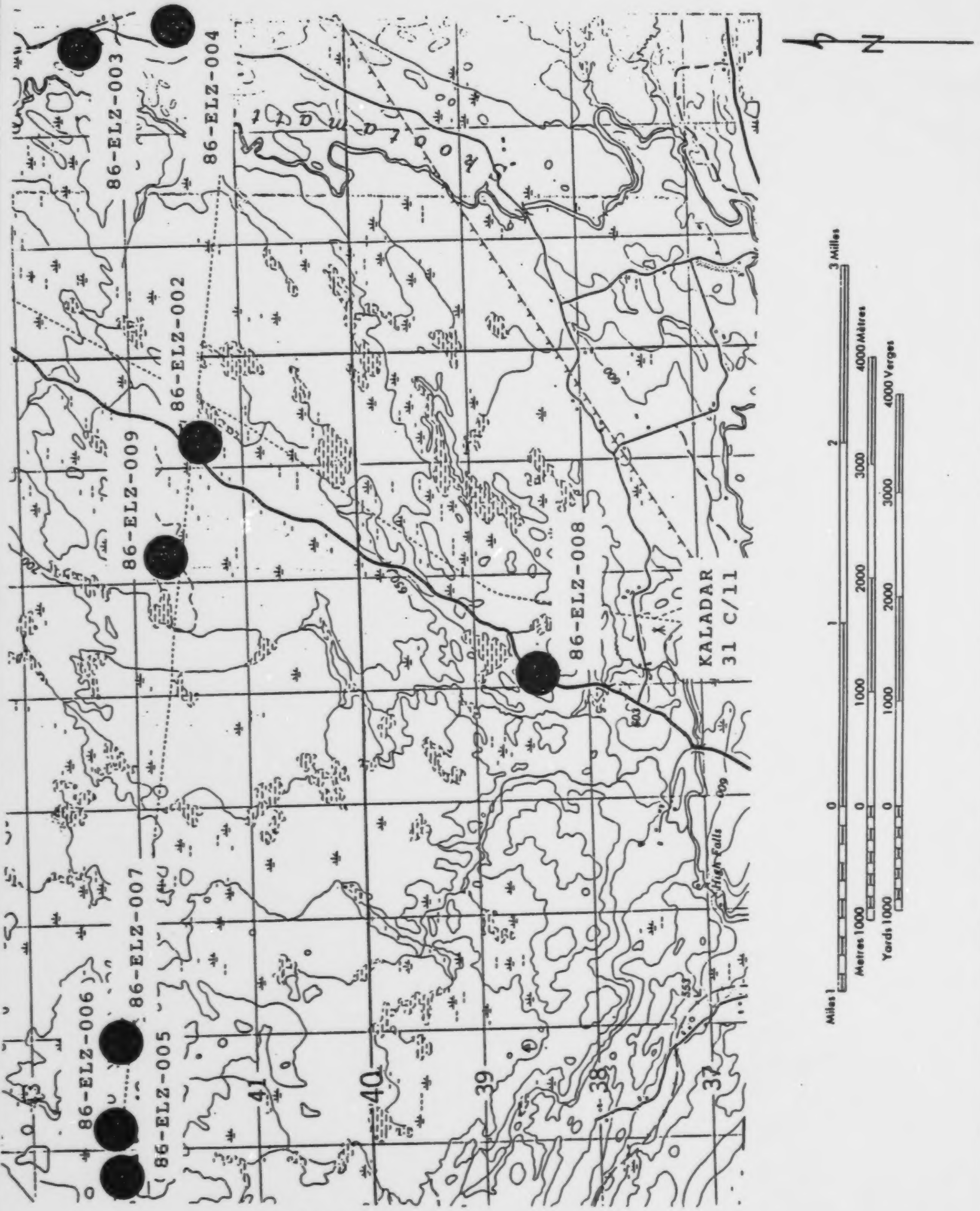
Meen, V.B., and Harding, W.D.
1942: Grimsthorpe-Kennebec Area, Counties of Hastings, Lennox and Addington, and Frontenac, Ontario; Ontario Department of Mines, Map 51D, scale 1 inch to 1 mile.

Parks, W.A.
1912: Building and ornamental stones of Canada; Canada Dept. Mines, Report No. 100.

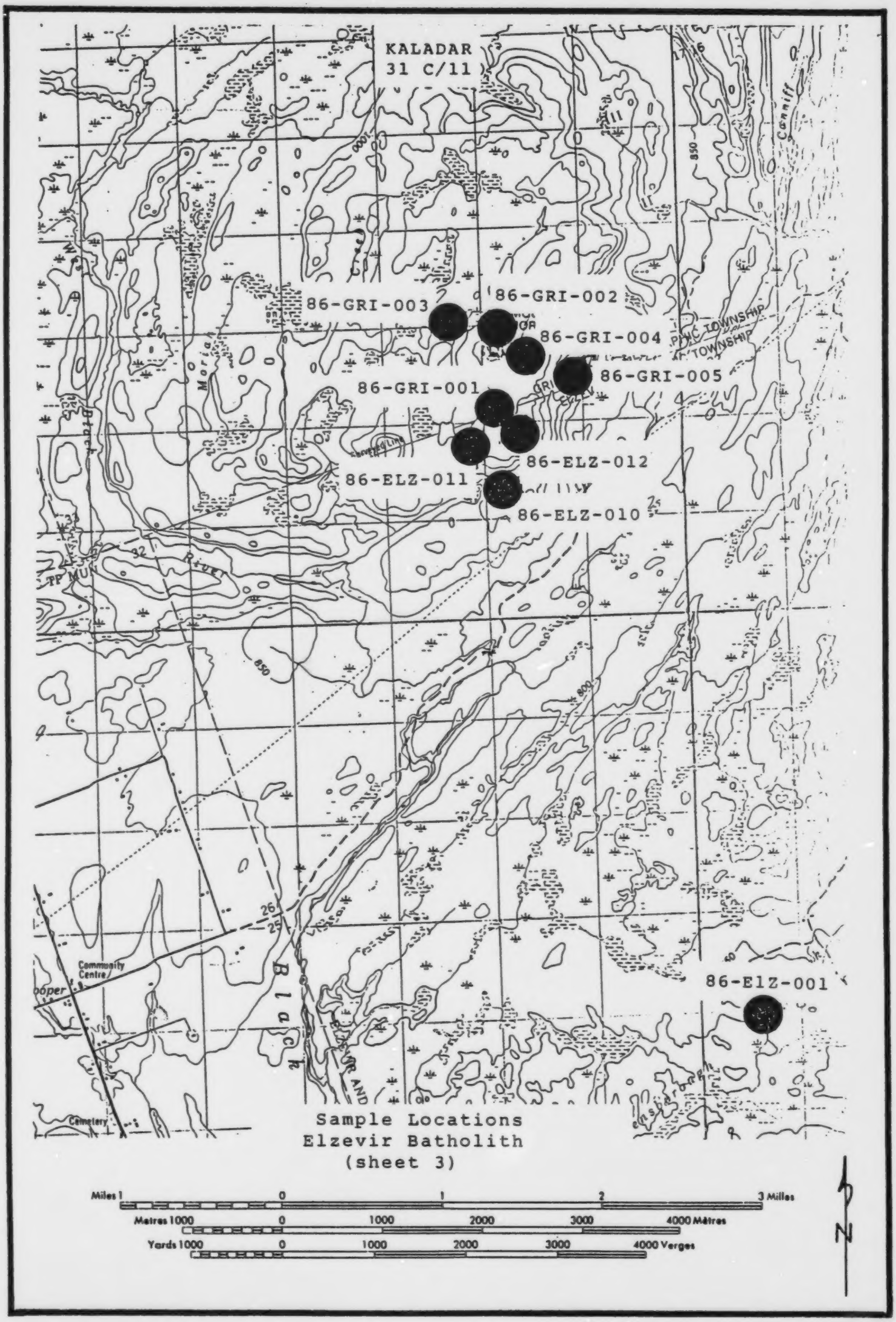
Wolff, J.M.
1982: Geology of the Kaladar Area, Frontenac, and Lennox and Addington Counties; Ontario Geological Survey, Report 215, 94p. Accompanied by Map 2432, scale 1:31 680.


KALADAR
31 C/11
ANGLESEA GEOG TP
KALADAR GEOG TP
32
Deerock
Lake
Creek
Denis
Lake
McDonald
86-KAL-002
86-KAL-004
86-KAL-001
86-KAL-005
KALADAR ANGLESEA AND EFFINGHAM TP MUN
LENNOX AND ADDINGTON COUNTY
HASTINGS COUNTY
Town Hall
Flinton
River
850
798
750
800
835
900
I
III
IV
XI
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Elzevir Batholith
(sheet 1)


86-ELZ-003
86-ELZ-004
86-ELZ-002
86-ELZ-009
86-ELZ-008
86-ELZ-006
86-ELZ-007
86-ELZ-005
KALADAR
31 C/11
N
41
40
39
38
37
High Falls
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges

Sample Locations
Elzevir Batholith
(sheet 2)


KALADAR
31 C/11
86-GRI-003
86-GRI-002
86-GRI-004
86-GRI-005
86-GRI-001
86-ELZ-012
86-ELZ-011
86-ELZ-010
86-ElZ-001
Moria
River
Black
Community Centre
Cemetery
Conniff
TOWNSHIP
850
800
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Elzevir Batholith
(sheet 3)

BUILDING STONE INVENTORY

Property No. 86-KAL-001 **Pluton Name** Elzevir Batholith

Property Name Flinton 1 **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Kaladar **Lot** 23 **Con.** 1

NTS 31C/11 **UTM Co-ordinates: Easting** 323000 **Northing** 4950900

Property Status Prospect **Air Photo No.** 78-4448-128-15

Production History Nil

Use of Explosives: Yes X **No** **Type** For roadwork

Colour: Fresh Surface Grey

Weathered Surface Light grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No. Weak** X **Mod. Strong Strike Dip**

Formed By Alignment of biotite

Bedding: Yes No X **Strike Dip Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** (X)

Limited Jointing Moderate Jointing X **Intensive Jointing** (X)

A) Strike 103 degrees **Dip** 48 degrees S **Spacing** 0.5-2 m

B) Strike 05 degrees **Dip** vertical **Spacing** 0.3-1 m

C) Strike Dip Spacing

D) Strike Dip Spacing

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

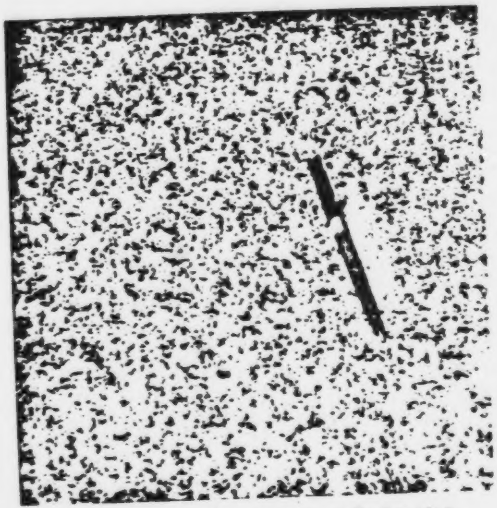
Other Features: Limited quartz veining and pods (less than 15 cm in width); rare but large mafic xenoliths up to 20 m long.

Possible Uses: Ashlar, paving stone, landscaping stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: Jointing is moderate to intense with some quartz veining and mafic inclusions. Outcrop exposure is poor.

General appearance of outcrop exhibiting moderate jointing.
86-KAL-001



Textural close-up of light grey granodiorite.
86-KAL-001

BUILDING STONE INVENTORY

Property No. 86-KAL-002 **Pluton Name** Elzevir Batholith

Property Name Deerock Lake **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Kaladar **Lot** 29 **Con.** 4

NTS 31C/11 **UTM Co-ordinates: Easting** 323200 **Northing** 4955300

Property Status Prospect **Air Photo No.** 78-4451-143-72

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Grey

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** X **Mod.** **Strong** **Strike** 95 degrees
Dip 80 degrees N

Formed By Alignment of biotite

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** (X)

A) Strike 120 degrees **Dip** Steep **Spacing** 0.5-1 m

B) Strike 020 degrees **Dip** Steep **Spacing** 1-3 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz veining and pods, one mafic inclusion observed

Possible Uses: Paving stone, ashlar, landscaping stone, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: Jointing is moderate and may facilitate the extraction of small quarry blocks. Some quartz veining and rare mafic inclusion are present.

General view of outcrop showing 10 m high scarp along road. 86-KAL-002

Textural close-up of grey granodiorite. 86-KAL-002

BUILDING STONE INVENTORY

Property No. 86-KAL-004 **Pluton Name** Elzevir Batholith

Property Name Cow Hill **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Kaladar **Lot** 24, 25 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 324000 **Northing** 4952300

Property Status Prospect **Air Photo No.** 73-4449 129-5

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface White (with biotite flakes) grey

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable** (X)

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** **Strike** 85 degrees
Dip 80 degrees E

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Abundant quartz veining and granitic/aplite stringers/dikes/pods, mafic inclusions also noted.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: Similar to the other sites visited in the Elzevir Batholith. This property displays poor potential for building stone due to the abundance of quartz veining, felsic stringers, and larger aplite dikes and pods. Mafic inclusions were also noted at this site. This is a medium grained, weakly foliated grey granodiorite.

Outcrop area as seen looking to the north. 86-KAL-004

Localized view depicting abundance of quartz stringers. 86-KAL-004

BUILDING STONE INVENTORY

Property No. 86-KAL-005 **Pluton Name** Elzevir Batholith

Property Name Flinton-2 **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Kaladar **Lot** 23 **Con.** 1,2

NTS 31C/11 **UTM Co-ordinates: Easting** 321900 **Northing** 4950400

Property Status Prospect **Air Photo No.** 78-4448-123-16

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Grey

Weathered Surface Grey-white

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** X **Mod.** **Strong** **Strike** 150 degrees **Dip** Steep

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 175 degrees **Dip** 060 degrees E **Spacing** 2-3 m

B) Strike 080 degrees **Dip** 090 degrees **Spacing** 1-2 m

C) Strike 040 degrees **Dip** 090 degrees **Spacing** 0.5-1.0 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Abundant quartz veins and pods mostly west of road (up to 0.3 m wide), occasional mafic inclusions (0.5-3 m wide) minor felsic stringers.

Possible Uses: Ashlar, paving stone, small quarry blocks, landscaping stone.

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a medium grained, weakly foliated grey granodiorite. Deleterious features include numerous quartz veins and pods, mafic inclusions, minor felsic stringers and inconsistent jointing.

General appearance of joint-free areas. 86-KAL-005

Quartz pods and mafic inclusions were noted in the above photograph. 86-KAL-005

BUILDING STONE INVENTORY

Property No. 86-ELZ-001 **Pluton Name** Elzevir Batholith

Property Name Queensborough Creek **Commercial Stone Name** Granite

Geological Rock Name Quartz Diorite to Granodiorite

Township Elzevir **Lot** 22 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 310500 **Northing** 4946000

Property Status Prospect **Air Photo No.** 78-4445-106-118

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey (white with biotite flakes)

Weathered Surface Grey

Uniform X **Variable** (X)

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** **Variable** X

Texture: Foliated (rarely massive) **Uniform** **Variable** X

Fabric: Yes X **No. Weak** X **Mod. Strong Strike** 105 degrees **Dip**

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** (X) **Intensive Jointing** X

A) Strike 83 degrees **Dip** **Spacing** 0.5-1 m Conjugate

B) Strike 143 degrees **Dip** **Spacing** 0.5-1 m Joints

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** X **No** **Type** Chlorite (alteration of biotite) **Percent** Trace

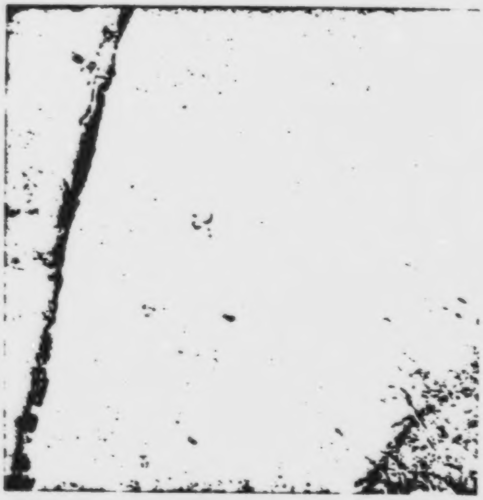
Other Features: Rare mafic inclusions, quartz veining, felsic stringers

Possible Uses: Ashlar, paving stone, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This is a grey granodiorite with a weak foliation. Both regular and irregular joint patterns are present and joint intensity ranges from moderate to intense. Joint intensity decreases towards the northeast part of the area.

General view of outcrop area. 86-ELZ-001



Close-up view of granite showing older quartz veins cut by younger diabase dikes. 86-ELZ-001

BUILDING STONE INVENTORY

Property No. 86-ELZ-002

Pluton Name Elzevir Batholith

Property Name County Road 2
(Flinton Road)
at Hydro line

Commercial Stone Name Granite

Geological Rock Name Granodiorite

Township Elzevir

Lot 10 **Con.** 8

NTS 31C/11 **UTM Co-ordinates: Easting** 319200 **Northing** 4941400

Property Status Prospect

Air Photo No. 78-4439-132-85,86

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Medium to very fine **Uniform** **Variable** X

Texture: Massive to foliated **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** **Strike** **Dip**

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 130 degrees **Dip** 065 degrees E **Spacing** 0.5 m

B) **Strike** **Dip** **Spacing**

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

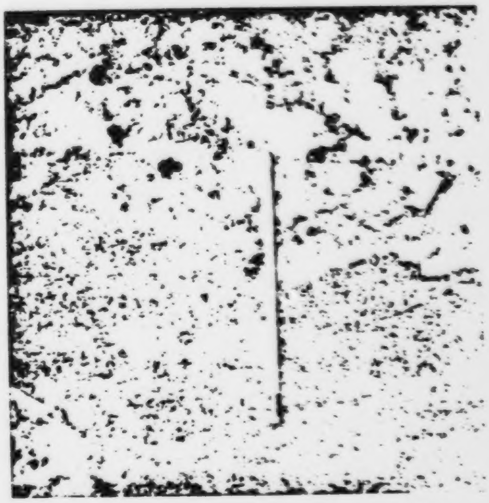
Other Features: Quartz veining, felsic stringers

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: The rock in this area is grey to white granodiorite. This area appears to be intensely jointed and shows a wide variation in texture and colour. The western portion of the area contains massive medium grained biotite granodiorite while to the east, the rock is fine grained and foliated.

Overall view showing nature of jointing and extent of outcrop.
86-ELZ-002



Close-up view depicting both weathered and fresh surfaces.
86-ELZ-002

BUILDING STONE INVENTORY

Property No. 86-ELZ-003 **Pluton Name** Elzevir Batholith

Property Name Skootamatta River **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Elzevir **Lot** 10 **Con.** 11

NTS 31C/11 **UTM Co-ordinates: Easting** 322800 **Northing** 4942400

Property Status Prospect **Air Photo No.** 78-4440-191-106

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey

Weathered Surface Pinkish Grey

Uniform **Variable** X

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing** (X)

A) Strike	100 degrees	**Dip**	90 degrees	**Spacing**	0.5 (1-2m)
B) Strike	sub-horizontal	**Dip**		**Spacing**	0.5 m see photo
C) Strike	120 degrees	**Dip**	80 degrees W	**Spacing**	.5-1.5
D) Strike		**Dip**		**Spacing**	

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veining and pods, some horizontal sheeting observed in 3 m scarp

Possible Uses: Ashlar, paving stone, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a massive, medium grained grey granodiorite. Jointing is generally intense, however some areas display a limited potential for small quarry blocks. Rare quartz veins and pods are present.

Outcrop showing general appearance of prospect. 86-ELZ-003

3 m scarp showing sub-horizontal sheeting approximately 100-130 m west of road. 86-ELZ-003

BUILDING STONE INVENTORY

Property No. 86-ELZ-004 **Pluton Name** Elzevir Batholith

Property Name Flinton Creek **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Elzevir **Lot** 8 **Con.** 11

NTS 31C/11 **UTM Co-ordinates: Easting** 323000 **Northing** 4941550

Property Status Prospect **Air Photo No.** 78-4439-132-90

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: .5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive to slightly foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** **Strike** 020 degrees **Dip** 70 degrees W

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** (X)

Limited Jointing X **Moderate Jointing** X **Intensive Jointing**

A) **Strike** 110-120 degrees **Dip** 090 degrees **Spacing** 0.5-5.0 m (subparallel to foliation)

B) **Strike** 020 degrees **Dip** 090 degrees **Spacing** 0.5-5.0 m

C) **Strike** subhorizontal **Dip** **Spacing** 1 m

D) **Strike** subhorizontal **Dip** **Spacing** 0.2-0.5 m

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Minor quartz veining (rare 10 cm wide to mm scale joint fillings) - one pegmatite dike (1 m wide) Observed - minor surface exfoliation

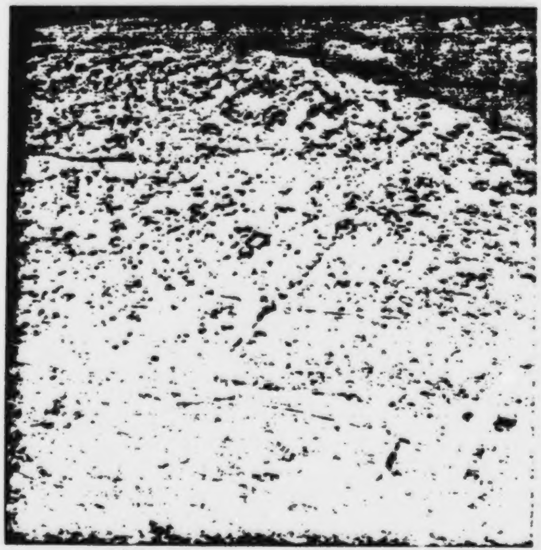
Possible Uses: Potentially small quarry blocks, ashlar.

Outcrop Exposure: Good X Fair Poor

Comments: This medium grained, grey granodiorite has a weak foliation. Quartz veins commonly occur subparallel to foliation or subparallel to the major joint sets. Exfoliation is evident in local areas. Major joint sets are widely spaced, however weakly developed joints are closer spaced and generally form irregular patterns. This area is recommended for further evaluation.

General appearance of outcrop showing large, relatively joint free areas. 86-ELZ-004

2 m high outcrop along access road. showing subhorizontal jointing. 86-ELZ-004



Note minor qtz. vng (1 m strike) parallel to compass related to jointing (120) as joint fillings. Also note weak hairline jointing subparallel to gneissosity (020) w occ. assoc'd mm wide qtz filling 86-ELZ-004

0.2 m spaced sheeting intersecting with jointing (100). 86-ELZ-004

BUILDING STONE INVENTORY

Property No. 86-ELZ-005 **Pluton Name** Elzevir Batholith

Property Name Barry Farm-1 **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Elzevir **Lot** 15 **Con.** 4

NTS 31C/11 **UTM Co-ordinates: Easting** 312750 **Northing** 4942250

Property Status Prospect **Air Photo No.** 78-4442-142-85

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark grey to white

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth: 1 cm

Grain Size: Fine-medium **Uniform** **Variable** X

Texture: Gneissic to massive **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** X **Mod.** to **Strong** X **Strike** **Dip**

Formed By Gneissic Banding

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 115 degrees **Dip** 090 degrees **Spacing** 0.5-1.0 m

B) **Strike** 090 degrees **Dip** 090 degrees **Spacing** 0.5 m

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Abundant quartz veining (mostly related to 115 degrees jointing, occasional pegmatite and aplite dikes/stringers, rare mafic inclusions.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good X Fair Poor

Comments: The rock in this area varies between fine grained, dark grey, well foliated granodiorite to medium grained, grey massive granodiorite. The textural variation coupled with the intense jointing and quartz veining limits the building stone potential of this site.

View of west face of outcrop.
Note vertical and horizontal
jointing. 86-ELZ-005

BUILDING STONE INVENTORY

Property No. 86-ELZ-006 **Pluton Name** Elzevir Batholith

Property Name Barry Farm-2 **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Elzevir **Lot** 14 **Con.** 4

NTS 31C/11 **UTM Co-ordinates: Easting** 313150 **Northing** 4942200

Property Status Prospect **Air Photo No.** 78-4442-142-86

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Greyish

Weathered Surface Grey-pinkish

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Slightly foliated to massive **Uniform** X **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** 100 degrees **Dip** 80 degrees E

Formed By Mineral alignment - biotite, some quartz and feldspar

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing** (X)

A) Strike	095 degrees	**Dip**	090 degrees	**Spacing**	0.5-2.5 m	avg. 1.7 m
B) Strike	015 degrees	**Dip**	090 degrees	**Spacing**	0.5-3.0 m	avg. 1.0 m
C) Strike		**Dip**		**Spacing**		
D) Strike		**Dip**		**Spacing**		

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

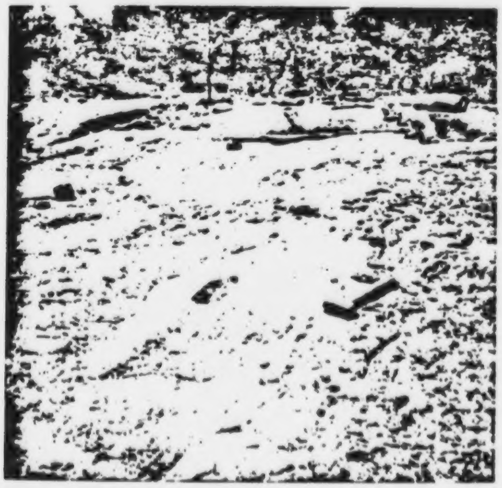
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veining, aplite stringers and dikes (0.2 m wide) extensive exfoliation

Possible Uses: Paving stone, ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a slightly foliated grey granodiorite. Quartz veining, granitic stringers and extensive exfoliation are present in this area. Small 10 m X 10 m areas show limited jointing.



General view of outcrop showing very small granitic stringers. 86-ELZ-006

Fresh surfaces showing textural and colour variations. 86-ELZ-0

BUILDING STONE INVENTORY

Property No. 86-ELZ-007 **Pluton Name** Elzevir Batholith

Property Name Elzevir Creek **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Elzevir **Lot** 14 **Con.** 5

NTS 31C/11 **UTM Co-ordinates: Easting** 313900 **Northing** 4942100

Property Status Prospect **Air Photo No.** 78-4443-187-226

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey-white

Weathered Surface Grey-white

Uniform X **Variable** (X)

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable** (X)

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** 025 degrees **Dip** 80 degrees E

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** (X)

A) Strike 140 degrees **Dip** 090 degrees **Spacing** 0.5-1.5 m

B) Strike 085 degrees **Dip** 070 degrees N **Spacing** 0.5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Abundant felsic stringers (average 1 cm wide), minor quartz veining, surface exfoliation common (1-2 cm thick)

Possible Uses: Landscaping stone, ashlar, crushed stone

Outcrop Exposure: Good X Fair Poor

Comments: This rock is a moderately foliated, medium grained grey granodiorite. Jointing is moderate in local areas. Numerous granitic and quartz veins and stringers occur throughout area.

East facing slope of outcrop. Note exfoliation toward bottom left. 86-ELZ-007

Close-up of medium grained granodiorite with felsic stringer Handlens for scale. 86-ELZ-007

BUILDING STONE INVENTORY

Property No. 86-ELZ-008 Pluton Name Elzevir Batholith

Property Name Theresa 603 Commercial Stone Name Granite

Geological Rock Name Granodiorite

Township Elzevir Lot 6,7 Con. 6

NTS 31C/11 UTM Co-ordinates: Easting 317100 Northing 4036450

Property Status Prospect Air Photo No. 78-4440-191-114

Production History Nil

Use of Explosives: Yes No X Type

Colour: Fresh Surface Grey

Weathered Surface Pinkish white

Uniform X Variable (X)

Weathering Depth: 1 cm

Grain Size: Medium Uniform Variable X

Texture: Foliated Uniform X Variable

Fabric: Yes X No. Weak Mod. X Strong Strike 028 degrees
Dip 80 degrees E

Formed By Alignment of biotite

Bedding: Yes No X Strike Dip Avg. Thickness

Jointing: Regular Pattern X Irregular Pattern (X)

Limited Jointing Moderate Jointing X Intensive Jointing (X)

A) Strike 120 degrees Dip 090 degrees Spacing 0.5-2.0 m avg. 1 m

B) Strike 040 degrees Dip 090 degrees Spacing 0.3-1.5 m

C) Strike Dip Spacing

D) Strike Dip Spacing

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Moderate quartz veining (average 3 cm wide) associated with joint set at 120 degrees, minor local oblique jointing, felsic stringers.

Possible Uses: Landscaping stone, ashlar, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: This rock is a medium grained, moderately foliated granodiorite. Jointing occurs in regular joint sets. The quartz veins present in this outcrop are associated with the 120 degree joint set. Joint spacing is generally less than 1 m. A 6 meter cliff on the west side of the road shows subhorizontal jointing with 1 to 2 meter spacing. Rare oblique jointing is also present.

General appearance of outcrop showing moderate jointing. 86-ELZ-008

BUILDING STONE INVENTORY

Property No. 86-ELZ-009 **Pluton Name** Elzevir Batholith

Property Name Cerqua Hunt Camp **Commercial Stone Name** Granite

Geological Rock Name Granodiorite

Township Elzevir **Lot** 11 **Con.** 7

NTS 31C/11 **UTM Co-ordinates: Easting** 318200 **Northing** 4941700

Property Status Prospect **Air Photo No.** 78-4442-142-91

Production History Nil

Use of Explosives: Yes No X Type

Colour: Fresh Surface Grey

Weathered Surface Grey

Uniform X Variable (X)

Weathering Depth: .5 cm

Grain Size: Medium Uniform X Variable

Texture: Slightly foliated Uniform X Variable

Fabric: Yes X No. Weak X Mod. Strong Strike 160 degrees Dip Steep

Formed By Alignment of biotite

Bedding: Yes No X Strike Dip Avg. Thickness

Jointing: Regular Pattern Irregular Pattern

Limited Jointing Moderate Jointing X Intensive Jointing

A) Strike 130-160 degrees Dip 090 degrees Spacing 0.5-1.5 m (up to 5.0 m) avg. 1 m

B) Strike 060 degrees Dip 090 degrees Spacing 0.5-1.0 m

C) Strike Dip Spacing

D) Strike Dip Spacing

Potential For Quarry Blocks: Fair

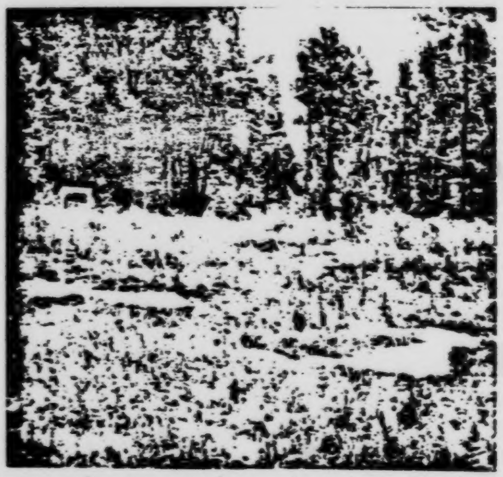
Deleterious Minerals: Yes No X Type Percent

Other Features: Local irregular gneissic banding (mm to cm scale), rare felsic stringers ($\leq$ 1 cm wide), rare mm scale quartz veining

Possible Uses: Landscaping stone, ashlar, crushed stone

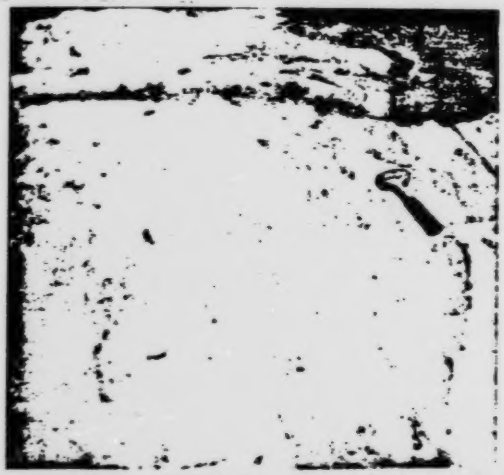
Outcrop Exposure: Good Fair Poor X

Comments: This grey granodiorite is slightly coarser than other sample sites in the Elzevir Batholith. This site also exhibits lower joint frequency. There is irregular gneissic banding with the rare granitic stringers and quartz veins.



Joint-free patches require stripping for better evaluation. 86-ELZ-009

Note: granitic stringers (left of pen)
gneissic banding (right of pen)



Note gneissic banding parallel to hammer.
86-ELZ-009

EMPEY GRANITE

LOCATION: LOT 21, CONCESSION 3, MADOC TOWNSHIP (NORTHWEST QUADRANT OF MADOC TOWNSHIP)
NTS 31C/12 OGS MAP #2154
GEOLOGICAL REPORT #73

SAMPLE SITES: 86-MAD-001

DESCRIPTION OF AREA

The Empey Granite is described by Hewitt (1968, p.15) as follows:

"A small area of coarse-grained pink granite outcrops on lot 21, concession III, Madoc township, near Empey. The granite is composed of interlocking grains of quartz, oligoclase, and microcline microperthite, and minor accessory fluorite, magnetite, muscovite, and biotite. The granite may be related in age to the Deloro pluton."

Intense, irregular jointing was observed at the sample site.

CONCLUSIONS

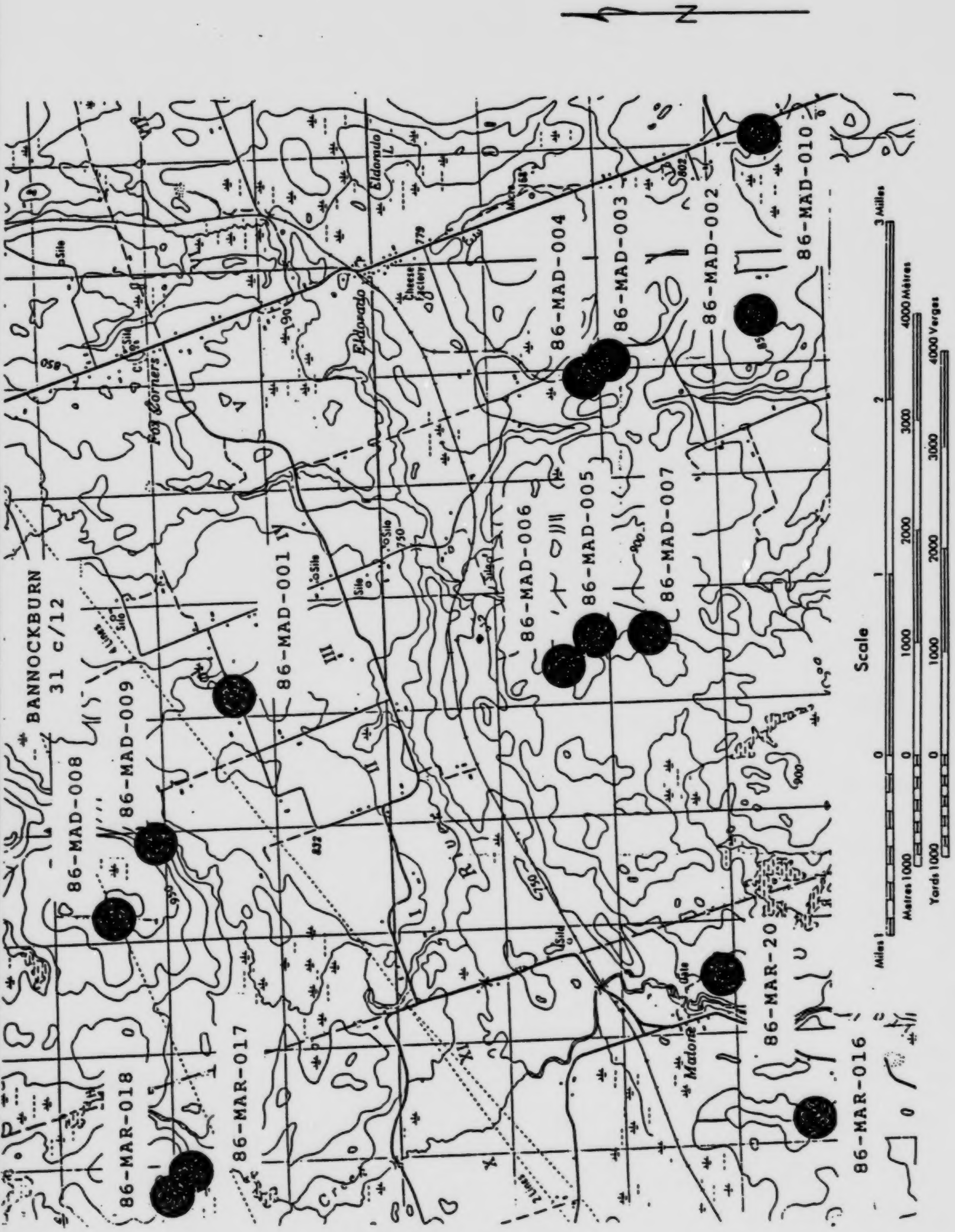
The Empey granite, although texturally uniform, has little potential as a source of building stone due to intense jointing.

POTENTIAL

POOR	MODERATE	GOOD
86-MAD-001		

REFERENCES

Hewitt, D.F.
1968: Geology of Madoc Township and the North Part of Huntingdon Township; Ontario Department of Mines, Geological Report 73, 45p.


N
BANNOCKBURN
31 C/12
86-MAD-008
86-MAD-009
86-MAD-001
86-MAD-006
86-MAD-005
86-MAD-007
86-MAD-004
86-MAD-003
86-MAD-002
86-MAD-010
86-MAR-018
86-MAR-017
86-MAR-20
86-MAR-016
Fox Corners
Eldorado
Malone
Scale
Miles
Metres
Yards

Sample Locations
Empey Granite

BUILDING STONE INVENTORY

Property No. 86-MAD-001 **Pluton Name** Empey Granite

Property Name Roadside **Commercial Stone Name** Granite

Geological Rock Name Quartz Syenite

Township Madoc **Lot** 21 **Con.** 3

NTS 31C/12 **UTM Co-ordinates: Easting** 296200 **Northing** 4941350

Property Status Prospect **Air Photo No.** 78-4442-142-69

Production History Nil

Use of Explosives: Yes X **No** **Type** Roadcut

Colour: Fresh Surface Dark pink

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 0.5 cm

Grain Size: Medium to coarse **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, plagioclase quartz, minor magnetite, green mineral (alteration of feldspar)

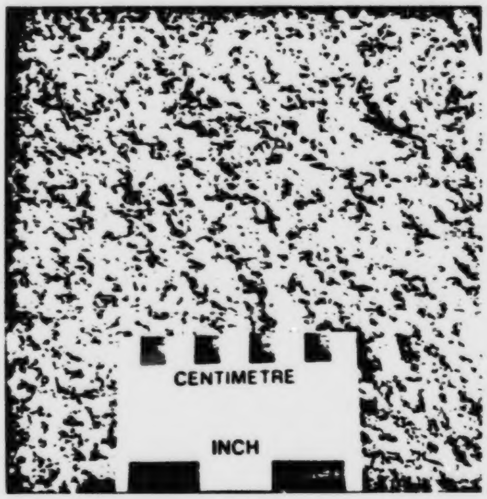
Deleterious Minerals: **Yes** X **No** **Type** **Percent** 3%

Other Features:

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a medium to coarse grained quartz syenite. The feldspars show evidence of alteration to an indeterminate green mineral. This outcrop has a consistent texture (ie. few veins or blemishes) however, the secondary alteration and jointing limit the building stone potential of the rock. The use of explosives restricts joint interpretation.



Close-up showing coarse grained nature of the granite.
86-MAD-001

GAWLEY CREEK SYENITE

LOCATION: Northwest portion of Madoc township and north-east portion of Marmora township.
NTS 31C/12 OGS MAP #2154
GEOLOGICAL REPORT #73

SAMPLE SITES: 86-MAR-017, 86-MAR-018, 86-MAD-008, 86-MAD-009

DESCRIPTION OF AREA

Hewitt (1968, p.14-15) describes the Gawley Creek Syenite as follows:

> "The Gawley Creek syenite occupies the northwestern part of Madoc township. The syenite pluton is about 4 miles long in a north-south direction and 4 miles wide in an east-west direction. It extends into Marmora township. Most of the pluton is composed of coarse-grained pink biotite-hornblende syenite similar to the Mount Moriah syenite of Grimsthorpe township. Thin section examination indicates that the syenite is composed predominantly of microcline microperthite and cryptoperthitic oligoclase in large irregular sutured grains. Hornblende and biotite are varietal accessories. Minor accessories include sphene, opaques, apatite, and epidote. Some oligoclase is present in several slides.
>
> The eastern end of the syenite pluton in the vicinity of the Bannockburn gold mine is dark-grey coarse-grained biotite syenodiorite that is composed of large crystals of oligoclase with biotite as a varietal accessory. Minor constituents include magnetite, pyrite, apatite, titanite, zoisite, and calcite."

The Gawley Creek syenite contains surprisingly few inclusions, veins, joint fillings or other irregularities. The distribution of minerals is consistent giving the rock a very uniform colour. It was also noted that the colour near the core of the pluton was much better than that of the marginal areas.

Grain size is medium and uniform. Jointing tends to be irregular and intense throughout most of the area, however moderate jointing does occurs locally.

CONCLUSIONS

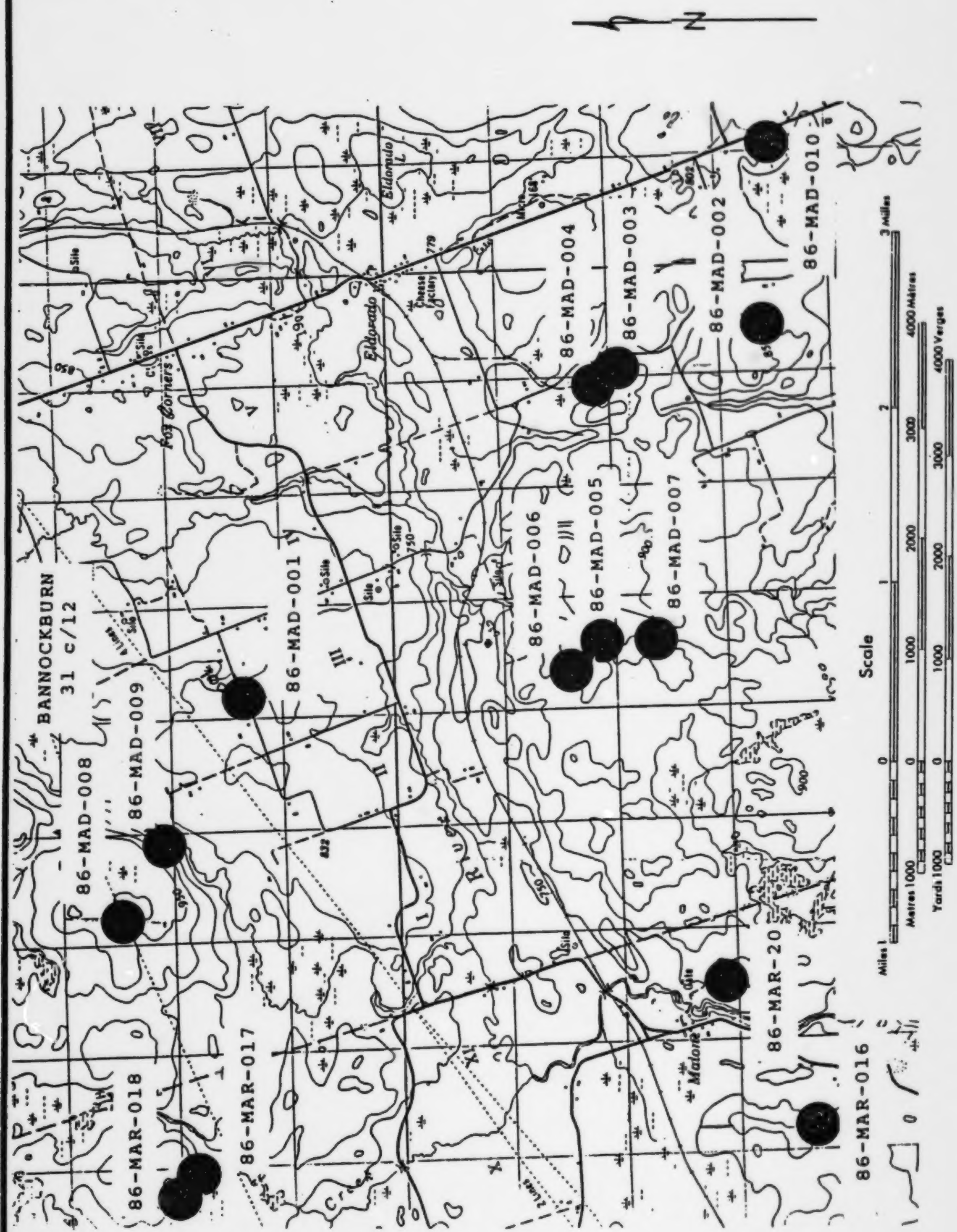
The intensity and irregularity of the jointing limit the potential for large quarry blocks. Chlorite alteration was also observed near the margins of this syenite. These factors detract from the building stone potential at this site.

POTENTIAL

POOR	MODERATE	GOOD
86-MAR-017 86-MAR-018 86-MAD-008 86-MAD-009		

REFERENCES

Hewitt, D.F.
1968: Geology of Madoc Township and the North Part of Huntingdon Township; Ontario Department of Mines, Geological Report 73, 45p.


N
BANNOCKBURN
31 c/12
86-MAD-008
86-MAD-009
86-MAD-001
86-MAD-006
86-MAD-005
86-MAD-007
86-MAD-004
86-MAD-003
86-MAD-002
86-MAD-010
86-MAR-018
86-MAR-017
86-MAR-20
86-MAR-016
Fox Corners
Eldorado
Eldorado L
Madoc
Malone
Creek
Cheese factory
Silo
Scale
Miles 1
Metres 1000
Yards 1000
0
1
2
3 Miles
1000
2000
3000
4000 Mètres
4000 Verges

Sample Locations
Gawley Creek Syenite

BUILDING STONE INVENTORY

Property No. 86-MAR-17 **Pluton Name** Gawley Creek Syenite

Property Name Gawley Ck-1 **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Marmora **Lot** 25 **Con.** 10

NTS 31C/12 **UTM Co-ordinates: Easting** 291900 **Northing** 4941900

Property Status Prospect **Air Photo No.** 78-4442-142-63

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish brown

Weathered Surface Bleached pink to black

Uniform **Variable** X

Weathering Depth: 1 cm to 1.5 cm

Grain Size: Medium **Uniform** Slightly **Variable** X

Texture: Massive **Uniform** **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz (chlorite)

Deleterious Minerals: Yes X No Type Chlorite, sulphides Percent <5%

Other Features: Zones with coarse mineral grains, hematite staining.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: This rock is a reddish brown, massive syenite. The grain size is variable at the outcrop scale and the presence of hematite staining creates some variation in colour. The mafics show signs of chloritization. These factors, coupled with the intense irregular jointing limit building stone potential for this site.

Overall view of outcrop area. Exposure is fair. 86-MAR-017

BUILDING STONE INVENTORY

Property No. 86-MAR-018 **Pluton Name** Gawley Creek Syenite

Property Name Gawley Ck-2 **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Marmora **Lot** 25 **Con.** 10

NTS 31C/12 **UTM Co-ordinates: Easting** 291700 **Northing** 4941000

Property Status Prospect **Air Photo No.** 78-4442-142-63

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish brown

Weathered Surface Pink to grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, amphibole (chlorite), (quartz), (magnetite)

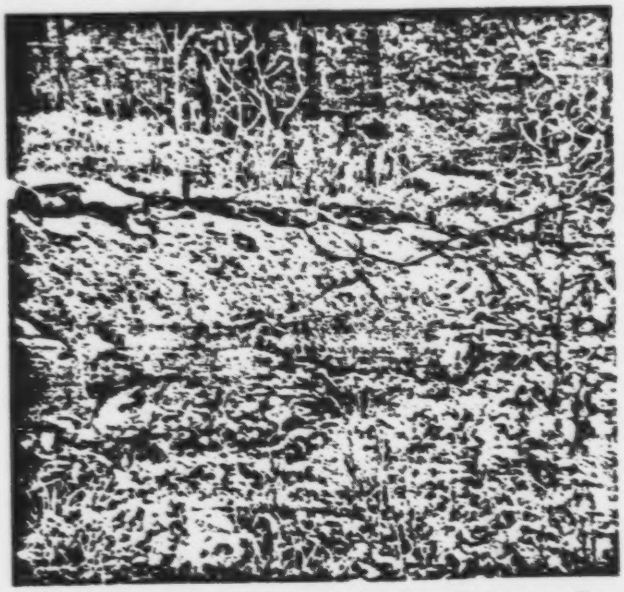
Deleterious Minerals: Yes No X Type Percent

Other Features: Good benching visible

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair Poor X

Comments: This rock is a reddish brown medium grained syenite. Chloritized amphiboles, poor outcrop exposure, and moderate, irregular jointing limit the the potential for building stone development.



Outcrop area depicting benching and pink to grey weathered surface.
86-MAR-018

BUILDING STONE INVENTORY

Property No. 86-MAD-008 **Pluton Name** Gawley Creek Syenite

Property Name Hunt Camp Bluff **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Madoc **Lot** 25 **Con.** 1

NTS 31C/12 **UTM Co-ordinates: Easting** 294200 **Northing** 4942500

Property Status Prospect **Air Photo No.** 78-4442-142-62-65

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pinkish brown

Weathered Surface Mottled bleached pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium grained **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, magnetite

Deleterious Minerals: Yes No X Type Percent

Other Features: Rare hematite staining

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good X Fair Poor

Comments: This is a pinkish brown, medium grained massive syenite. The chlorite alteration observed near the margins of the Gawley Creek Syenite is not present at this site. Hence, this rock has a fresher appearance. The primary deleterious feature is the moderate to intense irregular jointing. Hematite staining was also observed.

Overall view of outcrop and good exposure. 86-MAD-008

Jointing is moderate to intense and irregular. 86-MAD-008

BUILDING STONE INVENTORY

Property No. 86-MAD-009

Property Name Cliff Face

Pluton Name Gawley Creek Syenite

Commercial Stone Name Granite

Geological Rock Name Syenite

Township Madoc

Lot 24 **Con.** 2

NTS 31C/12 **UTM Co-ordinates: Easting** 294900 **Northing** 4942100

Property Status Prospect

Air Photo No. 78-4442-142-65

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pinkish brown

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 1 to 2 cm - extensive in places

Grain Size: Medium to coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, amphibole, biotite, plagioclase, ± quartz

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** <1%

Other Features: Rock locally hosts vugs lined with biotite.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This outcrop of Gawley Creek Syenite is on a very steep slope which makes it difficult to evaluate. It is intensely jointed and is deeply weathered in places. This outcrop shows little potential for large quarry block extraction.

View of outcrop face looking
northwest from 500 m away.
86-MAD-009

GLANMIRE COMPLEX

LOCATION: North west corner of Tudor township, and west of Glanmire Lake.
NTS 31C/13 OGS MAP #2168
GEOLOGICAL REPORT #67

SAMPLE SITES: 86-TUD-009, 86-TUD-010, 86-TUD-011, 86-TUD-012

DESCRIPTION OF AREA

The Glanmire complex appears similar to the Beaver Creek in both character and potential for building stone. Rock types observed include mafic and felsic intrusives or hybrids that are locally sheared, brecciated or contain metasedimentary inclusions. According to Lumbers (1969), the intrusion is comprised mostly of sodic granitic to syenitic rocks. He has also mapped a narrow, marginal (W. side, S. half) mass of potassic granitic/syenitic affinity with the most abundant unit being quartz monzonite.

Like the Beaver Creek, the Glanmire complex exhibits poor exposure and other deleterious features such as variable lithology, inclusions and brecciation (almost the whole of the southern plug is shown as brecciated).

The quartz monzonite mass may contain some significant exposure at its southern end (access via Glanmire Lake Road). Rounded, white plagioclase "phenocrysts" ≤ 1 cm in size were noted and when cut and polished this may produce an attractive result.

CONCLUSIONS

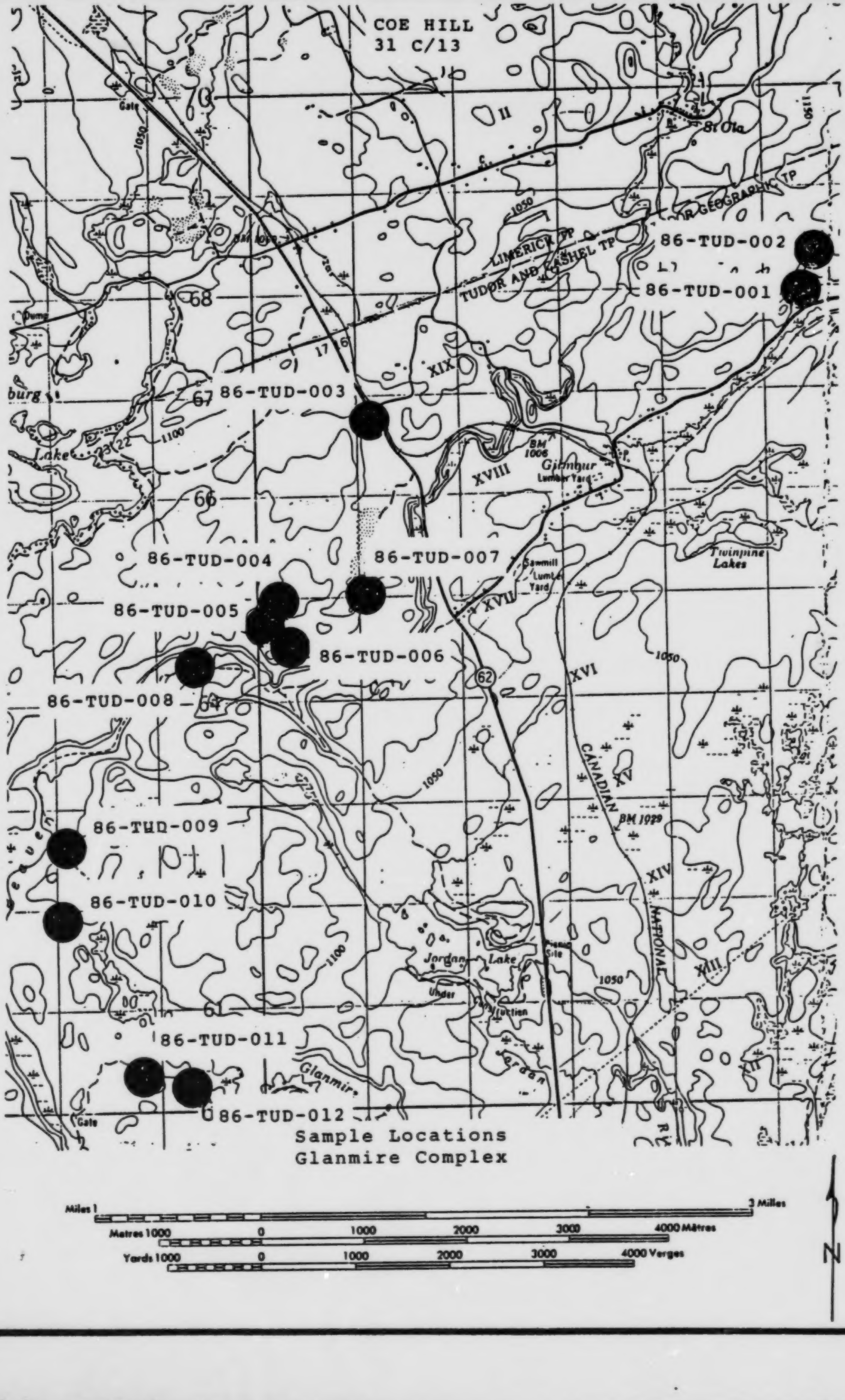
Overall the Glanmire complex does not warrant any follow-up (excepting rounded "phenocrysts" if considered desirable). Building stone potential is very limited. Ashlar, paving stone and rubble are the only uses that may be applicable.

POTENTIAL

POOR	MODERATE	GOOD
86-TUD-009		
86-TUD-010		
86-TUD-011		
86-TUD-012		

REFERENCES

Lumbers, S.B.
1969: Geology of Limerick and Tudor Townships, Hastings County, Ontario; Ontario Department of Mines, Geological Report 67.


COE HILL
31 C/13
86-TUD-002
86-TUD-001
86-TUD-003
86-TUD-004
86-TUD-007
86-TUD-005
86-TUD-006
86-TUD-008
86-TUD-009
86-TUD-010
86-TUD-011
86-TUD-012
St Ola
LIMERICK TP
TUDOR AND CASHEL TP
GEOGRAPHIC TP
Gilmour
Lumber Yard
Sawmill
Lumber Yard
Twinpine Lakes
CANADIAN NATIONAL
Jordan Lake
Picnic Site
Under Construction
Glanmire
Lake
Gate
Dump
62
XIX
XVIII
XVII
XVI
XV
XIV
XIII
XII
II
BM 1006
BM 1029
1050
1100
70
68
67
66
61
Miles 1
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Glanmire Complex

BUILDING STONE INVENTORY

Property No. 86-TUD-009 **Pluton Name** Glanmire Complex

Property Name Glanmire-1 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Tudor **Lot** 27 **Con.** 16

NTS 31C/13 **UTM Co-ordinates: Easting** 288100 **Northing** 4962600

Property Status Prospect **Air Photo No.** 69-4433-2-64

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Buff to grey to grey green

Weathered Surface Bleached grey

Uniform **Variable** X

Weathering Depth: .5 cm

Grain Size: Medium to fine **Uniform** **Variable** X

Texture: Massive **Uniform** **Variable** X

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 175 degrees **Dip** 75 degrees W **Spacing** 1 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz

Deleterious Minerals: **Yes** X **No** **Type** Disseminated sulfides **Percent** 1%

Other Features: Up to 1 cm rusty vugs (Fe carbonate); altered feldspar, locally schistose, chlorite-rich metavolcanic inclusions (10 m long outcrop).

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This is a medium to fine grained granitic rock. It is generally massive but is schistose in places. The feldspar component has been sericitized locally. The rock contains mafic inclusions and Fe-carbonate filled vugs. Jointing is intensive and outcrop exposure is poor.

Close-up of fresh surface. Note mafic inclusions in the sample in the background. 86-TUD-009

BUILDING STONE INVENTORY

Property No. 86-TUD-010 **Pluton Name** Glanmire Complex

Property Name Glanmire-2 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Tudor **Lot** 28 **Con.** 15

NTS 31C/13 **UTM Co-ordinates: Easting** 288050 **Northing** 4961850

Property Status Prospect **Air Photo No.** 69-4433-2-64

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Grey green

Weathered Surface Whitish grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium-coarse **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar quartz, indeterminate mafic minerals; Mafic content: approx. 5-15%

Deleterious Minerals: **Yes** X **No** **Type** Disseminated sulfides **Percent** <1%

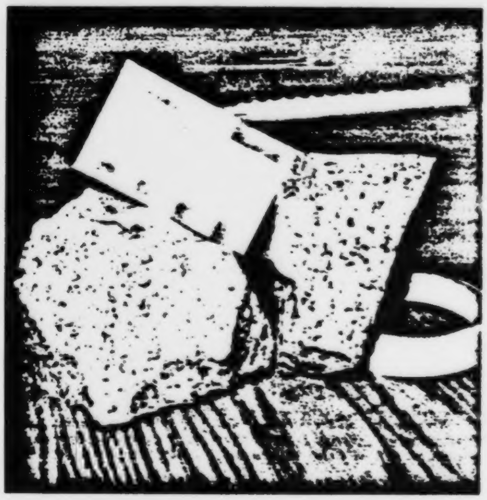
Other Features: Chlorite and carbonate coated joints; rusty fractures - occasionally vuggy; 0.5 m wide quartz vein containing sulfides observed, hematite staining.

Possible Uses: Crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor** X

Comments: This is a massive, medium grained, grey-green coloured granitic rock. The feldspar component has been sericitized. Sulphides and magnetite are disseminated throughout the rock and the mafic mineralogy was indeterminate in hand sample. The rock has a mottled, rusty appearance in places from sulphide alteration and joint planes were observed to be chlorite and carbonate coated. Jointing occurs in an intense, irregular pattern.

Outcrop exposure is fair to poor and is very rubbly at this location. 86-TUD-010



Massive, medium to coarse-grained grey-green granite. Both the fresh and weathered surfaces are shown in the photograph. 86-TUD-010

BUILDING STONE INVENTORY

Property No. 86-TUD-011 **Pluton Name** Glanmire Complex

Property Name Glanmire-3 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Tudor **Lot** 27 **Con.** 14

NTS 31C/13 **UTM Co-ordinates: Easting** 288850 **Northing** 4960350

Property Status Prospect **Air Photo No.** 69-4432-6-275

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Bleached grey-white

Uniform X **Variable**

Weathering Depth: .5 cm

Grain Size: Medium to rarely coarse **Uniform** X **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing** Inadequate Exposure

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: .5 cm aplite stringers; feldspar megacrysts (to 1 cm in length), feldspar alteration

Possible Uses: Ashlar, paving stone, rubble

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a massive pink granite which contains a few megacrysts (up to 1 cm in length). The feldspar component has been sericitized to some degree; a phenomenon observed at other sample sites on the Glanmire Complex. The mafic component of this rock is minor (<3% approximately). Poor outcrop exposure limits joint interpretation. The jointing observed occurred in an irregular pattern. Aplite stringers were also observed in this rock.

BUILDING STONE INVENTORY

Property No. 86-TUD-012 **Pluton Name** Glanmire Complex

Property Name Glanmire-4 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Tudor **Lot** 26 **Con.** 13

NTS 31C/13 **UTM Co-ordinates: Easting** 289300 **Northing** 4960150

Property Status Prospect **Air Photo No.** 69-4432-6-275

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Bleached pink-grey

Uniform X **Variable**

Weathering Depth: .5 cm

Grain Size: Medium (rarely coarse) **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing** Inadequate Exposure

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite, magnetite

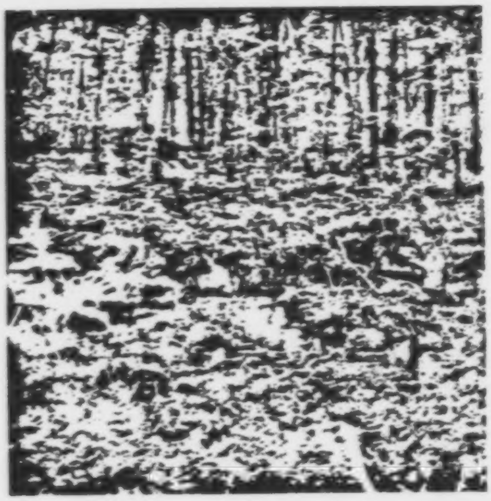
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Up to 10-20 cm wide quartz segregations. Rare rusty vugs local quartz veining.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: Poor exposure (2-3 square meters) along edge of low ridge. Inadequate for proper assessment. Low development potential due to abundance of cottages and prominantly posted private land.



All outcrops such as this one in the glanmire complex display very little exposure. 86-TUD-012

LANARK-OSO MAFIC INTRUSION

LOCATION: EXTENDS FROM THE EAST SIDE OF SHARBOT LAKE IN SOUTHERN OSO TOWNSHIP THROUGH THE NORTHERN PART OF SOUTH SHERBROOKE TOWNSHIP
NTS 31C/15 OGS MAP #2471
GEOLOGICAL REPORT #228

SAMPLE SITES: 86-OSO-001, 86-OSO-002, 86-OSO-003, 86-OSO-008, 86-SSHER-001

DESCRIPTION OF AREA:

The Lanark-Oso mafic intrusion outcrops along a northeast trend parallel to the foliation of the enclosing high-grade gneiss. It is described by Wolff (1985, p.34) as "a well-differentiated mafic intrusion containing pyroxenite-peridotite, gabbro, anorthositic gabbro to gabbroic anorthosite, and anorthositic phases." Wolff also states that only the contacts have been metamorphosed, with little recrystallization evident within the anorthositic phases.

The rock at all sample sites is anorthosite. Deleterious features observed include quartz and granitic stringers, exfoliation, and intense jointing.

CONCLUSIONS

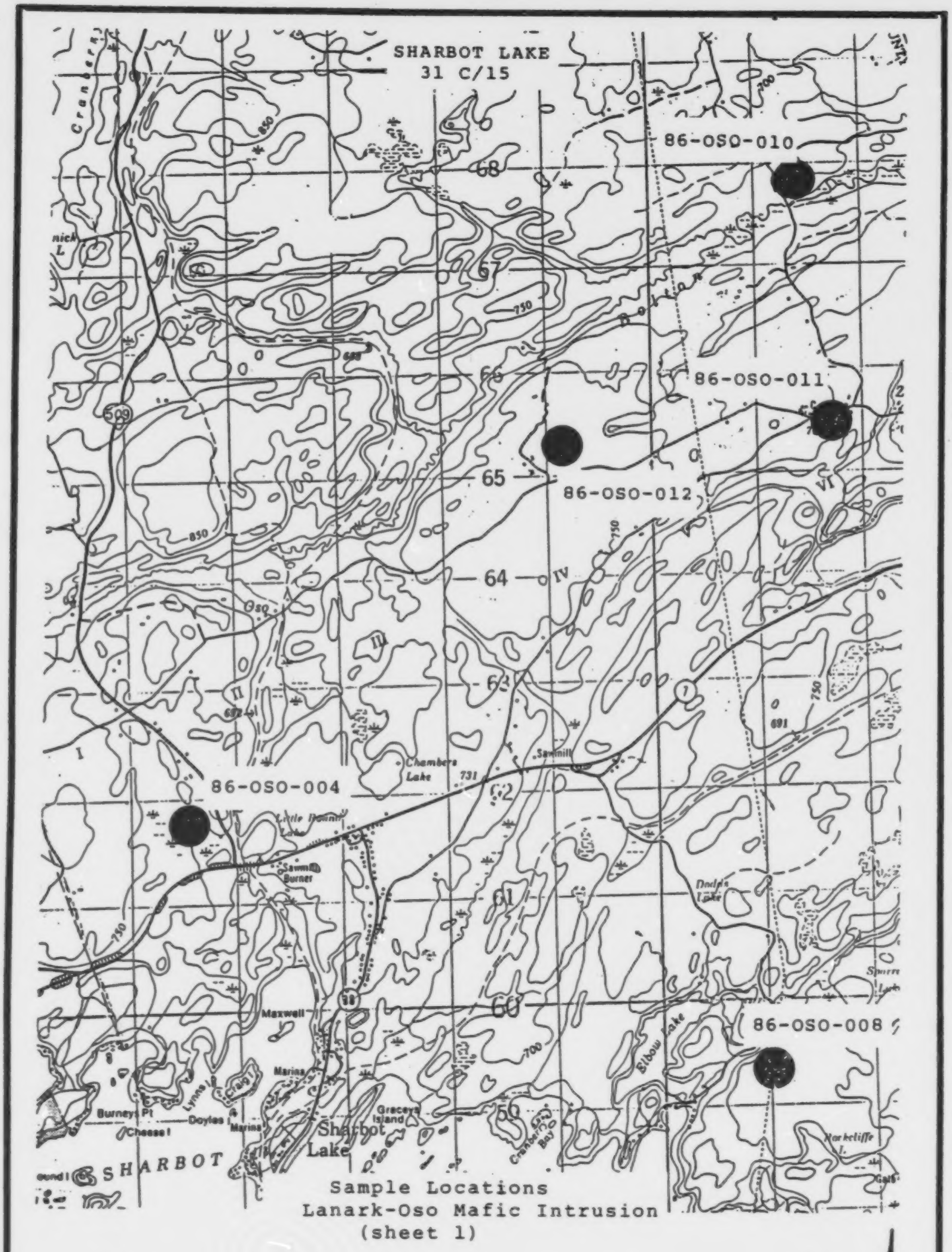
Based on the sample sites examined, the intrusion appears to have little potential for building stone. However, because the rock is described by Wolff as having a generally fresh appearance, further investigation is warranted in the central parts of the intrusion.

POTENTIAL

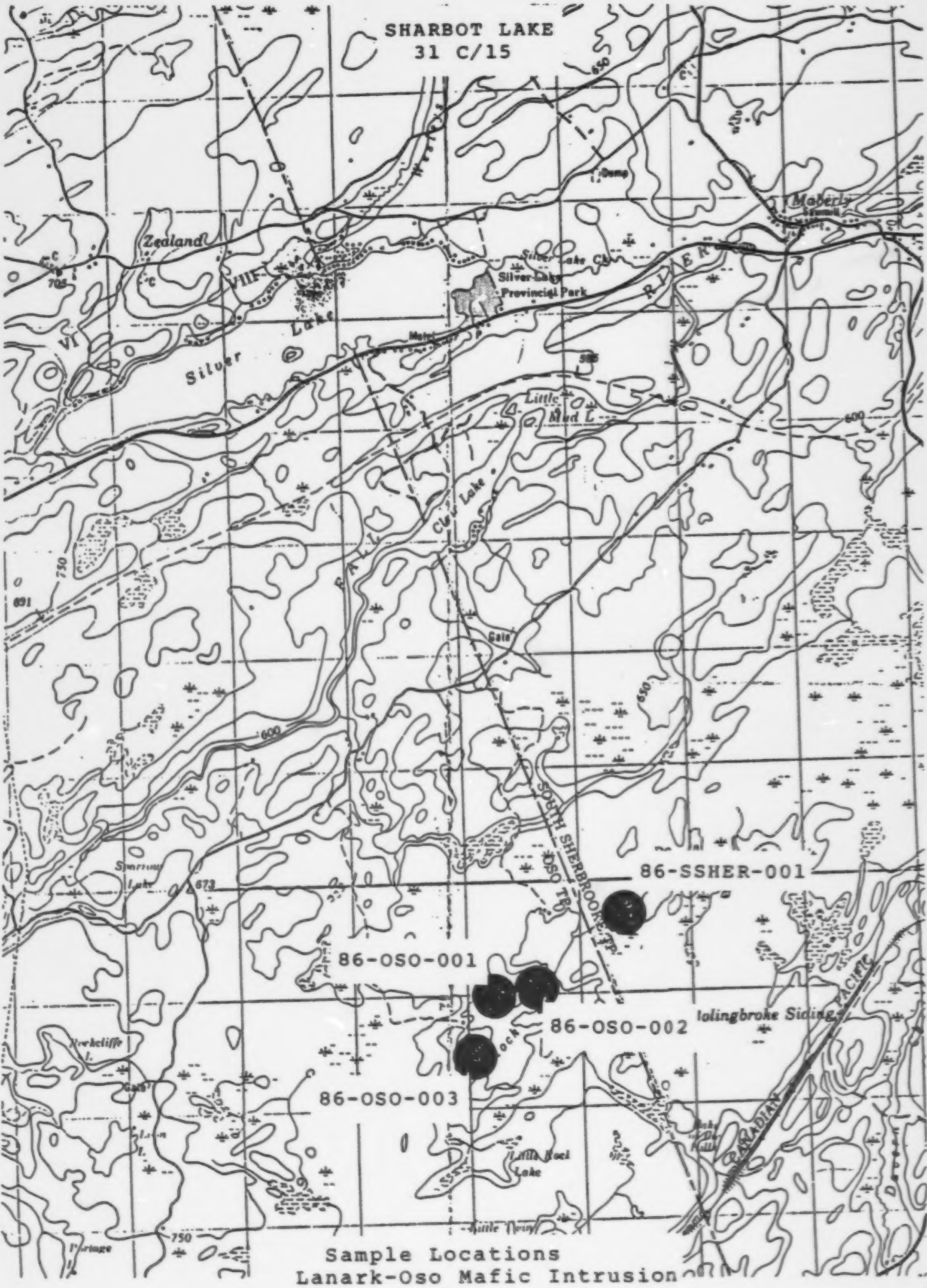
POOR	MODERATE	GOOD
86-OSO-001		
86-OSO-002		
86-OSO-003		
86-OSO-008		
86-SSHER-001		

REFERENCES

Wolff, J.M.
1985: Geology of the Sharbot Lake Area, Frontenac and Lanark Counties, Southeastern Ontario; Ontario Geological Survey Report 228, 70p. Accompanied by Map 2471, scale 1:31 680 to 1 inch to 1/2 mile.


SHARBOT LAKE
31 C/15
86-OSO-010
86-OSO-011
86-OSO-012
86-OSO-004
86-OSO-008
68
67
66
65
64
63
62
61
60
59
850
750
700
Cranberry
Bolton
Oso
509
7
38
I
II
III
IV
VI
Chambers Lake
Little Bonnie Lake
Sawmill Burner
Sawmill
Dodds Lake
Elbow Lake
Maxwell
Marina
Burneys Pt
Cheese I
Doyles I
Lynns I
Craig I
Graceys Island
Cranberry Bay
Sharbot Lake
SHARBOT
Horkcliffe L
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Lanark-Oso Mafic Intrusion
(sheet 1)


SHARBOT LAKE
31 C/15
Zealand
Silver Lake
Silver Lake Provincial Park
Silver Lake Cr
RIVER
FALL
Moberly
Little Mud L
Clear Lake
Gale
Sparrow Lake
SOUTH SHERBROOKE TP
OSO TP
86-SSHER-001
86-OSO-001
86-OSO-002
86-OSO-003
Bolingbroke Siding
CANADIAN PACIFIC
Little Noel Lake
Portage
VI
VIII
650
600
750
705
691
673

Sample Locations
Lanark-Oso Mafic Intrusion
(sheet 2)

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-OSO-001 **Pluton Name** Lanark-Oso Mafic Intrusion

Property Name Marshall Cottage **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Oso **Lot** 8 **Con.** 7

NTS 31C/15 **UTM Co-ordinates: Easting** 375300 **Northing** 4959000

Property Status Prospect **Air Photo No.** 78-4454-163-225

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Violet-black

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, pyroxene, (corundum)

Deleterious Minerals: **Yes X No** **Type** **Percent**

Other Features: Coarse corundum and pyroxene crystals, granitic stringers

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good X Fair** **Poor**

Comments: This rock is a medium grained, violet black anorthosite with coarse corundum and pyroxene crystals. It is cut by numerous quartz stringers and has intense irregular jointing. These factors limit the building stone potential of the area.

Overall view of outcrop showing good exposure. 86-OSO-001

BUILDING STONE INVENTORY

Property No. 86-OSO-002 **Pluton Name** Lanark Oso Mafic Intrusion

Property Name Marshall #2 **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Oso **Lot** 8 **Con.** 7

NTS 31C/15 **UTM Co-ordinates: Easting** 375550 **Northing** 4959050

Property Status Prospect **Air Photo No.** 78-4454-163-225

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Violet-black

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, pyroxene, corundum

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Granitic stringers, some exfoliation

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This outcrop is a medium grained black anorthosite which contains coarse corundum and diopside crystals. As was observed at other sites of the Lanark-Oso Mafic Intrusion, this rock contains intense irregular jointing and numerous quartz stringers. Hence, building stone potential is limited.

Fair outcrop exposure depicting irregular joint pattern. 86-OSO-002

BUILDING STONE INVENTORY

Property No. 85-OSO-003 **Pluton Name** Lanark-Oso Mafic Intrusion

Property Name Rock Lake **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Oso **Lot** 7 **Con.** 7

NTS 31C/15 **UTM Co-ordinates: Easting** 374950 **Northing** 4958450

Property Status Prospect **Air Photo No.** 78-4454-163-225

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey-blue

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth: 1-2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase feldspar, quartz

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** <1%

Other Features: Quartz stringers, sheeting (intense), coarse corundum, crystals

Possible Uses: Small ornamental objects, ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a grey blue, massive anorthosite. It is very competent and has many marketable characteristics. The objectionable features include intense irregular jointing, quartz stringers and rare coarse corundum crystals. These features diminish the building stone potential of this area.

Overall view of outcrop exhibiting irregular jointing and good exposure.
86-OSO-003

BUILDING STONE INVENTORY

Property No. 86-OSO-008 **Pluton Name** Lanark-Oso Mafic Intrusion

Property Name McGees Pond **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Oso **Lot** 11 **Con.** 4

NTS 31C/15 **UTM Co-ordinates: Easting** 371000 **Northing** 4959000

Property Status Prospect **Air Photo No.** 78-4454-163-216

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brownish-black

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, quartz, corundum pyroxene

Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

Other Features: Numerous quartz stringers, veins, and localized exfoliation

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **X** **Poor**

Comments: This black anorthosite has many appealing features, however, it also contains numerous quartz veins and stringers and intense irregular jointing. These factors decrease the potential of building stone development in this area.

Over all view of outcrop showing extensive jointing and fair outcrop exposure.
86-OSO-008

BUILDING STONE INVENTORY

Property No. 86-SSHER-001 **Pluton Name** Lanark-Oso-Mafic Intrusion

Property Name Deer Lake Inlet **Commercial Stone Name** Anorthosite

Geological Rock Name Anorthosite

Township South Sherbrooke **Lot** 5 **Con.** 6

NTS 31C/15 **UTM Co-ordinates: Easting** 376350 **Northing** 4959700

Property Status Prospect **Air Photo No.** 78-4458-164-180

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Bluish grey

Weathered Surface Grey to black

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Medium **Uniform** X Corundum phenocryst **Variable**

Texture: Massive (to weakly foliated) **Uniform** **Variable**

Fabric: Yes No. Weak X **Mod. Strong Strike** 142 degrees **Dip**

Formed By Elongation plus alignment of mafic inclusions

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X Especially exfoliation

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy:

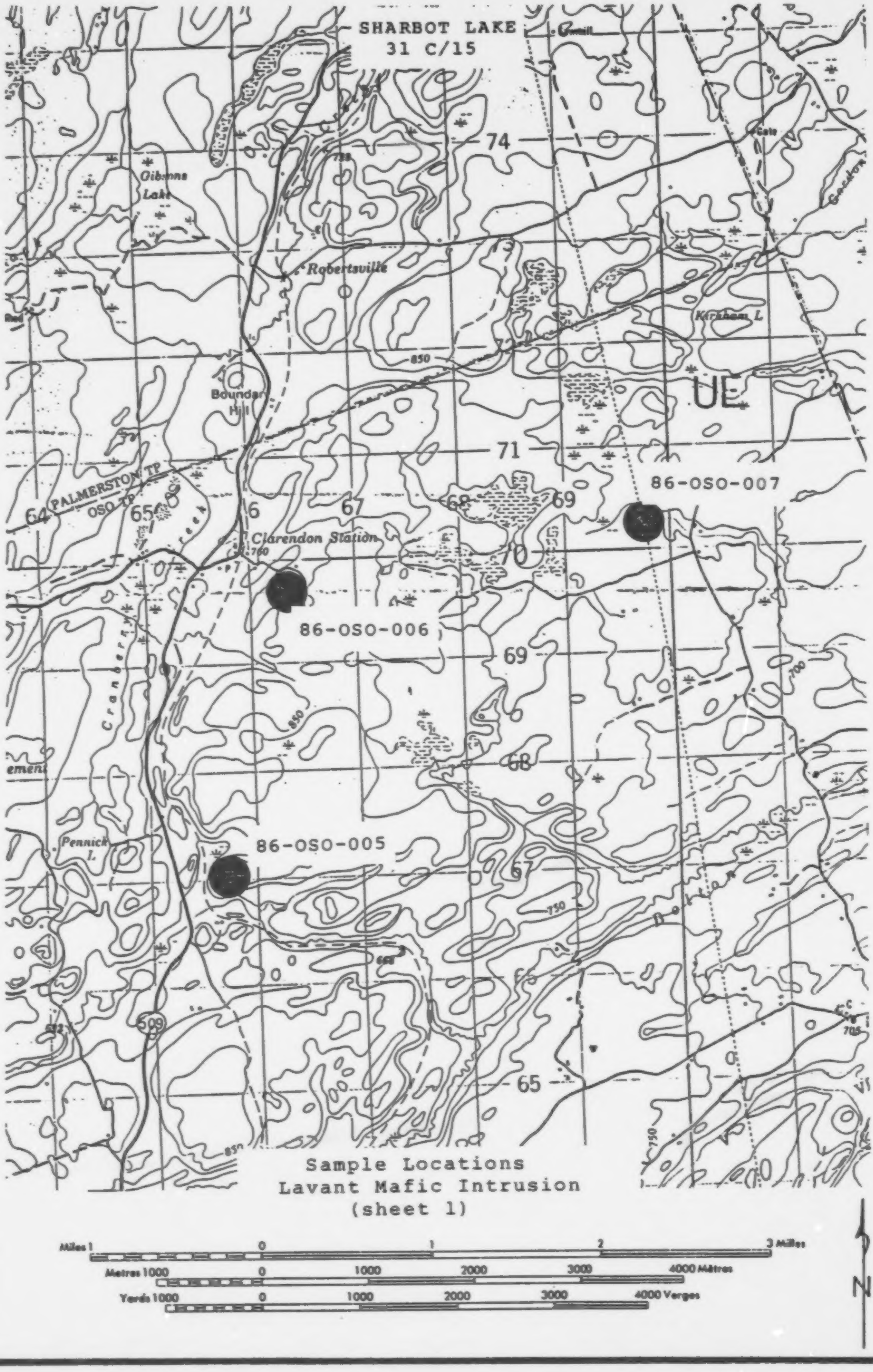
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veins, felsic pods, veins are both planar and sinuous, mafic inclusions, coarse corundum crystals, exfoliation intense

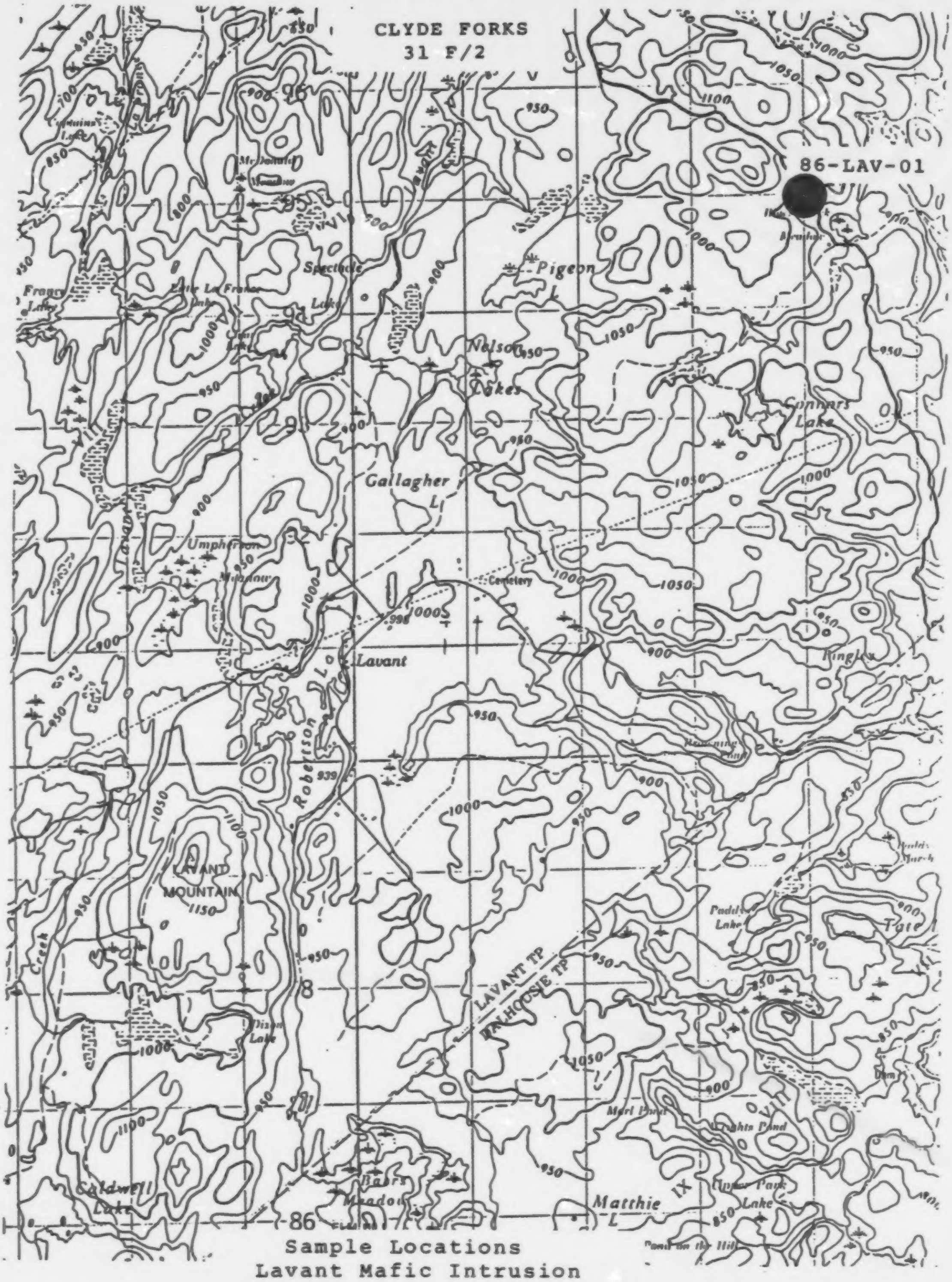
Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

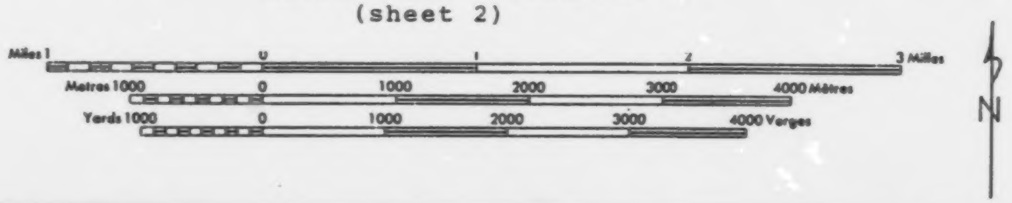
Comments: This is a dark bluish grey anorthosite of the Lanark-Oso Mafic Intrusion. It is medium-grained, generally massive, and contains mafic inclusions which appear to have a parallel alignment. Coarse corundum crystals are common. Jointing occurs in an intense irregular manner and numerous quartz stringers and veins are present within this cliff-like outcrop.


SHARBOT LAKE
31 C/15
74
Gibsons Lake
Robertsville
Kirkham L.
850
UE
Boundary Hill
71
PALMERSTON TP
OSO TP
64
65
6
67
68
69
70
86-OSO-007
Clarendon Station
86-OSO-006
69
Cranberry Creek
68
Pennick L.
86-OSO-005
67
750
509
65
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Lavant Mafic Intrusion
(sheet 1)


CLYDE FORKS
31 F/2
86-LAV-01
Pigeon
Spectacle Lake
Nelson Lakes
Connors Lake
Gallagher L
Umpherson Meadow
Lavant
Robertson L
Cemetery
Ringley
LAVANT MOUNTAIN
1150
Creek
Paddys Lake
Tate
LAVANT TP
DALHOUSIE TP
Dixon Lake
Marl Pond
Wrights Pond
Caldwell Lake
Barrs Meadow
Matthie L
Upper Park Lake
Pond on the Hill
86

Sample Locations
Lavant Mafic Intrusion
(sheet 2)


Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-OSO-005 **Pluton Name** Lavant Mafic Intrusion

Property Name Pennick Lake (East of 509) **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Oso **Lot** 27 **Con.** III

NTS 31C/15 **UTM Co-ordinates: Easting** 365700 **Northing** 4967070

Property Status Prospect **Air Photo No.** 78-4459-90-122

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Dark grey

Weathered Surface Light grey

Uniform **Variable** X

Weathering Depth: 1-2 mm

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz, corundum

Deleterious Minerals: Yes X No Type Biotite, sulphides **Percent** >30%

Other Features: Groupings of quartz crystals, large biotite crystals, (up to 2 cm)

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair Poor X

Comments: The Lavant Mafic Intrusion at this site, consists of metasomatically altered gabbro in which the mafic component has been depleted and carbonate and quartz have been added. The rock colour is inconsistent at the hand sample scale and the presence of sulphides and carbonate make this rock a poor candidate for building stone material.

Outcrop displaying intense vertical and oblique jointing.
86-OSO-005

BUILDING STONE INVENTORY

Property No. 86-OSO-006 **Pluton Name** Lavant Mafic Intrusion

Property Name Clarendon Station **Commercial Stone Name** Granite

Geological Rock Name Diorite

Township Oso **Lot** 29 **Con.** IV

NTS 31C/15 **UTM Co-ordinates: Easting** 366400 **Northing** 4969800

Property Status Prospect **Air Photo No.** 78-4461-186-201

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey (light)

Weathered Surface Dark grey

Uniform X **Variable**

Weathering Depth: 2-5 mm

Grain Size: Medium to coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 120 degrees **Dip** 90 degrees **Spacing** .5-2 m

B) Strike 80 degrees **Dip** **Spacing** .5-2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, amphibole, (biotite); **Mafic content:** approx. 50%

Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

Other Features: Quartz veins and stringers

Possible Uses: Ashlar and crushed stone

Outcrop Exposure: **Good** **Fair** **X** **Poor**

Comments: This is a competent grey diorite which represents a portion of the Lavant Intrusion. This rock has a fresh appearance but exhibits extensive variation in grain size. The building stone potential of this site is further limited by the intense regular and irregular jointing and the presence of quartz veins and stringers.

Outcrop displaying intense
jointing. 86-OSO-006

BUILDING STONE INVENTORY

Property No. 86-OSO-007 **Pluton Name** Lavant Mafic Intrusion

Property Name Clarendon ST. N. Hydro-line **Commercial Stone Name** Granite

Geological Rock Name Diorite

Township Oso **Lot** 30 **Con.** VI

NTS 31C/15 **UTM Co-ordinates: Easting** 369750 **Northing** 4970250

Property Status Prospect **Air Photo No.** 78-4461-186-203

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Black and white

Weathered Surface Light grey

Uniform X **Variable**

Weathering Depth: 1-2 mm

Grain Size: Fine **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Amphibole, feldspar

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Hematite coating - felsic dikes and quartz stringers

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a massive, fine grained diorite. The grain size and texture is consistent. Felsic dikes and quartz stringers were observed. Hematite staining is present along some joint planes. The intense irregular jointing is the primary feature that limits building stone potential.

View of outcrop along power line.
86-OSO-007

Low rounded nature of outcrop.
86-OSO-007

BUILDING STONE INVENTORY

Property No. 86-LAV-001 **Pluton Name** Lavant Mafic Intrusions

Property Name Black Creek Meadow **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Lavant **Lot** 6 **Con.** 4

NTS 31F/02 **UTM Co-ordinates:** **Easting** 374000 **Northing** 4995050

Property Status Roadcut **Air Photo No.**

Production History Nil

Use of Explosives: **Yes** X **No** **Type** High Velocity

Colour: **Fresh Surface** Violet tinted black

Weathered Surface Dull Grey

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Fine to coarse **Uniform** **Variable** X

Texture: Porphyritic **Uniform** **Variable** X

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A)	**Strike**	125 degrees	**Dip**	10 degrees NW	**Spacing**	1 m
B)	**Strike**	Horizontal	**Dip**	10 degrees E	**Spacing**	.5 m
C)	**Strike**		**Dip**		**Spacing**	
D)	**Strike**		**Dip**		**Spacing**	

Potential For Quarry Blocks: Poor

Mineralogy: Pyroxene, plagioclase

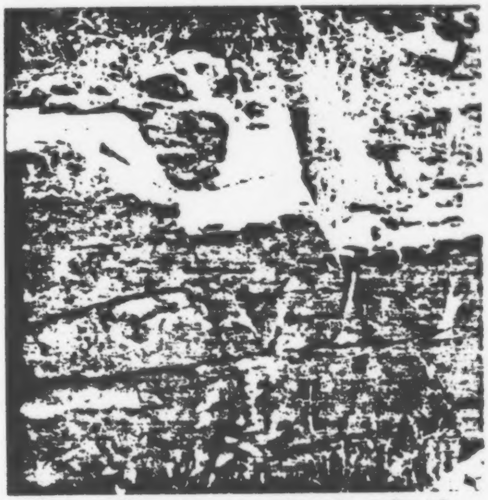
Deleterious Minerals: Yes X **No** **Type** Pyrite **Percent** Trace

Other Features: Numerous stringers, pyroxene, phenocrysts

Possible Uses: Ornamental stone

Outcrop Exposure: Good **Fair** X **Poor**

Comments: This black granite shows little or no potential for building stone due to extensive vertical and horizontal jointing and fine stringers and disseminations of pyrite. The groundmass appears to be almost entirely plagioclase, which surrounds phenocrysts of pyroxene. The rock is not very aesthetically appealing.



View of outcrop showing both
vertical and horizontal jointing.
Some weathered quartz veins are
also visible at top of outcrop
86-LAV-001

LEGGAT LAKE GRANITE

LOCATION: SOUTHEASTERN OLDEN TOWNSHIP, BETWEEN O'REILLY LAKE AND LONG LAKE
NTS 31C/10 OGS MAP #2449, 2053
GEOLOGICAL REPORT #216

SAMPLE SITES: 86-OLD-005, 86-OLD-006, 86-OLD-010, 86-OLD-011, 86-OLD-012, 86-OLD-013, 86-OLD-014

DESCRIPTION OF AREA

The Leggat Lake granite is described by Wolff (1985) as a dominantly quartz monzonite body which is compositionally and structurally related to the McLean Granitic Pluton located west of Long Lake.

The sample sites represent a north-south section across the western part of the intrusion. All sites except 86-OLD-005 and 006 show irregular, intense jointing and other deleterious features such as quartz pods, pyrite, hematite, and pegmatite dikes. Sites 005 and 006 at the southern margin of the intrusion show moderate jointing, but also contain quartz veins, pegmatite and hematite.

CONCLUSIONS

In general, the building stone potential is poor, but jointing in the southern part of the granite intrusion may allow the extraction of small quarry blocks.

POTENTIAL

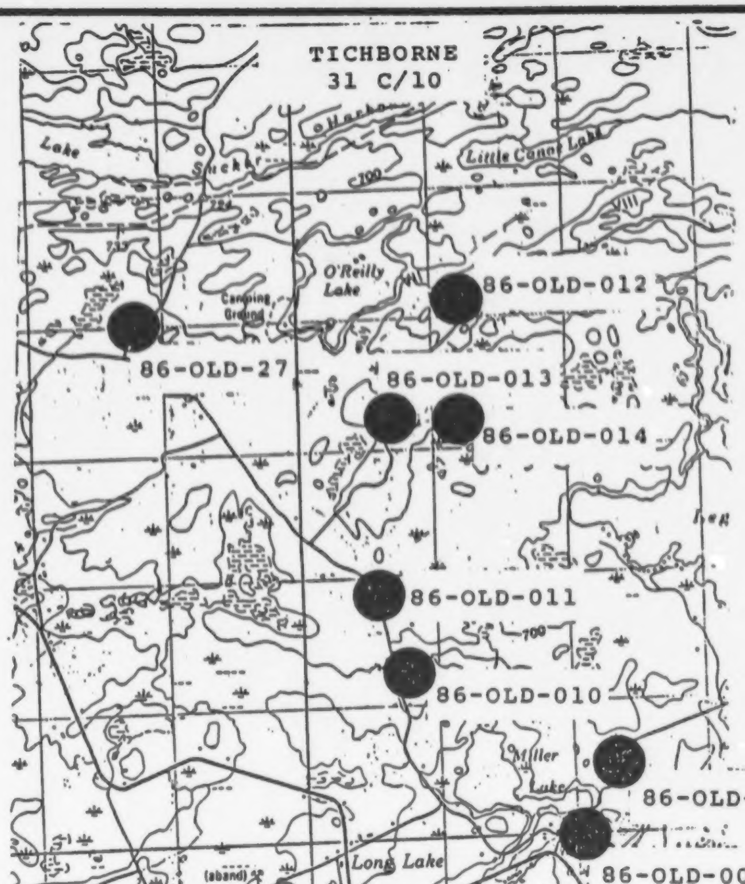
POOR MODERATE GOOD

86-OLD-005

86-OLD-006
86-OLD-010
86-OLD-011
86-OLD-012
86-OLD-013
86-OLD-014

REFERENCES

Wolff, J.M.
1982: Geology of the Long Lake Area; Ontario Geological Survey, Report 216, 76p. Accompanied by Map 2449, scale 1:31 680 or 1 inch to 1/2 mile.


TICHBORNE
31 C/10
Lake
Sucker
Little Cannon Lake
700
O'Reilly Lake
Camping Ground
86-OLD-012
86-OLD-27
86-OLD-013
86-OLD-014
86-OLD-011
700
86-OLD-010
Miller Lake
86-OLD-005
86-OLD-006
Long Lake
(aband)
650
650
Lake
Long
E TP MUN
86-HIN-002

Sample Locations
Leggat Lake Granite

Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-OLD-005 **Pluton Name** Leggat Lake Granite

Property Name Miller Lake **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 2 **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 362300 **Northing** 4950500

Property Status Prospect **Air Photo No.** 73-4449-129-46

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink with grey

Uniform X **Variable**

Weathering Depth: 1-3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 120 degrees	**Dip** 50 degrees N	**Spacing** 2m
B) Strike 0 degrees	**Dip** vertical	**Spacing** .5- 3m
C) Strike	**Dip**	**Spacing**
D) Strike	**Dip**	**Spacing**

Potential For Quarry Blocks: Poor to fair

Mineralogy: Feldspar, biotite, quartz Mafic content: approx. 10%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Sheeting (.2-1 m) hematite staining, quartz veins (to 4 cm in width) granitic stringers.

Possible Uses: Small building blocks (crushed stone, ashlar)

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This sample is a massive, medium grained pink granite. The biotite tends to occur in small knots (to 1 cm) but generally the texture and colour are consistent. Jointing occurs in regular and irregular patterns with moderate intensity. Sheeting tends to be more intense (average 0.5 m). Quartz veins, felsic stringers and minor hematite staining are also present in this rock.

Overall view of outcrop area exhibiting good exposure. 86-OLD-005

Outcrop depicting moderate regular jointing. 86-OLD-005

BUILDING STONE INVENTORY

Property No. 86-OLD-006 **Pluton Name** Leggat Lake Granite

Property Name Abbott Lake **Commercial Stone Name** Granite

Geological Rock Name Monzonite

Township Olden **Lot** 1 (NW), 2 (SW) **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 362000 **Northing** 4950000

Property Status Prospect **Air Photo No.** 78-4448-128-60

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 2 mm

Grain Size: Fine to medium **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 0 degrees **Dip** vertical **Spacing** 3 m

B) Strike 80 degrees **Dip** vertical **Spacing** 3 m

C) Strike 170 degrees **Dip** vertical **Spacing** 2 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite

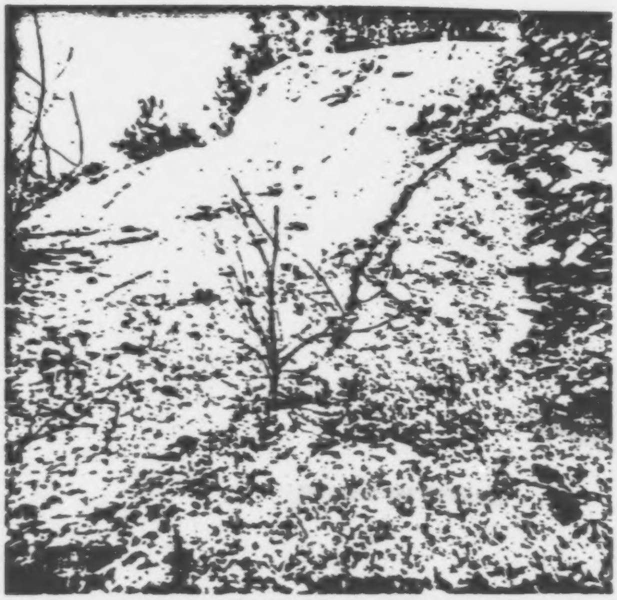
Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz veins, pegmatite dikes, sheeting (1/2 m) minor mafic alteration.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good X Fair Poor

Comments: This rock is a massive, pink monzonite. The grain size varies from fine to medium grained, even at the hand specimen size. The mafic component is somewhat altered. Jointing occurs in moderate intensity in both regular and irregular patterns. Quartz veins and pegmatite dikes were also observed in the area.



Outcrop area exhibiting good exposure along with moderate jointing. 86-OLD-006

BUILDING STONE INVENTORY

Property No. 86-OLD-010 **Pluton Name** Leggat Lake Granite

Property Name Long Lake North **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 4 midnorth **Con.** 6

NTS 31C/10 **UTM Co-ordinates: Easting** 360800 **Northing** 4951200

Property Status Prospect **Air Photo No.** 78-4449-129-44

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1-2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 120 degrees **Dip** vertical **Spacing** .1 to 1 m

B) Strike 10 degrees **Dip** vertical **Spacing** .1 to 2 m

C) Strike Horizontal **Dip** **Spacing** .5 to 1 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz pods rare, biotite alteration, hematite staining, minor exfoliation.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good Fair X Poor

Comments: This rock is a dull pink, medium grained, massive granite. Colour, grain size, and texture are uniform throughout the rock. The biotite component shows signs of alteration. Jointing occurs in both regular and irregular patterns with very close spacing. Further deleterious factors include hematite staining, rare quartz pods, and exfoliation. These factors limit building stone potential.

Overall view of outcrop area exhibiting fair exposure. 86-OLD-010

Horizontal sheeting was noted at 0.5 to 1.0 m spacing. 86-OLD-010

BUILDING STONE INVENTORY

Property No. 36-OLD-011 **Pluton Name** Leggat Lake Granite

Property Name Miller Lake North-West **Commercial Stone Name** Granite

Geological Rock Name Quartz Monozonite

Township Olden **Lot** 5 **Con.** 6

NTS 31C/10 **UTM Co-ordinates: Easting** 360600 **Northing** 4951850

Property Status Prospect **Air Photo No.** 77-4449-129-44

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 2 mm-5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 126 degrees **Dip** 90 degrees **Spacing** .1-1 m

B) Strike 40 degrees **Dip** 90 degrees **Spacing** .1-.5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz; Mafic content: approx. 15%

Deleterious Minerals: **Yes** X **No** **Type** Pyrite **Percent** Trace

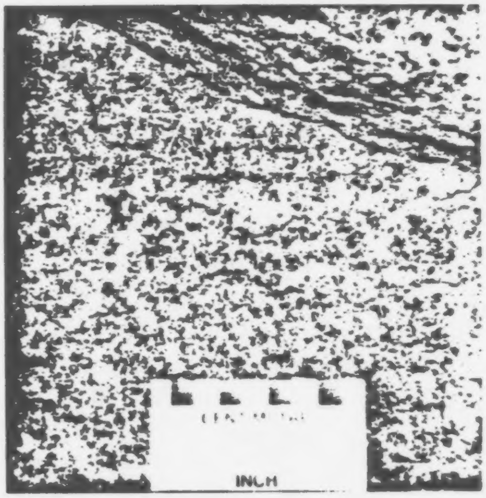
Other Features: Pegmatite, quartz stringer, aplite pod, hematite staining.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This sample is a medium grained, massive, pinkish-red, quartz monzonite. The primary factor which would tend to diminish building stone potential is the intense irregular and regular joint patterns. Other deleterious features include the presence of pyrite, hematite staining, and felsic stringers and veins.

General appearance of outcrop
showing irregular jointing.
86-OLD-011



Close-up of medium grain size
and massive texture.
86-OLD-011

BUILDING STONE INVENTORY

Property No. 86-OLD-012

Pluton Name Leggat Lake Granite

Property Name O'Reilly Lake East

Commercial Stone Name Granite

Geological Rock Name Biotite Quartz Monzonite

Township Olden

Lot 8 & 9 **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 361200 **Northing** 4954050

Property Status Prospect

Air Photo No. 78-4451-143-114

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark pink (dull)

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes **No.** **Weak** X **Mod.** **Strong** **Strike** **Dip**

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 10 degrees **Dip** 37 degrees NW **Spacing** .1 to 2 m

B) Strike 125 degrees **Dip** vertical **Spacing** .5 to .5 m

C) Strike 40 degrees **Dip** 58 degrees SE **Spacing** 10 m

D) Strike Subhorizontal **Dip** **Spacing** .5 m

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite (quartz); **Mafic content:** approx. 10-15%

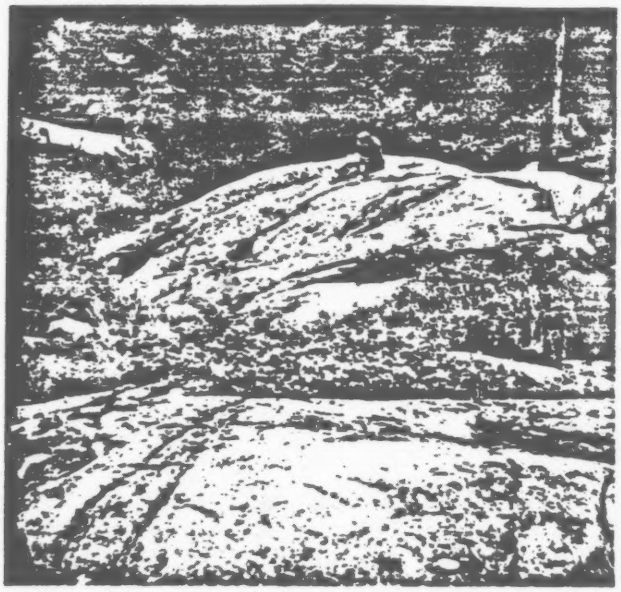
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Rare pegmatite dikes, rare hematite staining.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: Rare pegmatite dikes and hematite staining were observed, but these are not serious defects. Intense jointing is the principle factor that limits the building stone potential for this area.



Overall view of light pink biotite quartz monzonite. 86-OLD-012

Note intensive, regular and irregular jointing. 86-OLD-012

BUILDING STONE INVENTORY

Property No. 86-OLD-013 **Pluton Name** Leggat Lake Granite

Property Name O'Reilly Lake South **Commercial Stone Name** Granite

Geological Rock Name Monzonite

Township Olden **Lot** 7 (West 1/2) **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 360700 **Northing** 4953200

Property Status Prospect **Air Photo No.** 78-4450-131-47

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink-red

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: ≤ 3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive to slightly foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** **Strike** **Dip**

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike 140 degrees **Dip** 90 degrees **Spacing** ≤ 2 m

B) Strike 50 degrees **Dip** 90 degrees **Spacing** 1-3 m

C) Strike 100 degrees **Dip** **Spacing** .1-1 m

D) Strike Horizontal **Dip** **Spacing** 1/2 m

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite (quartz)

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

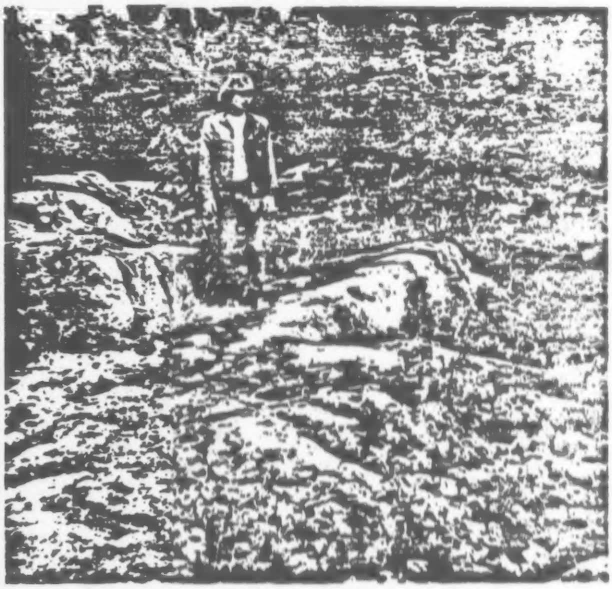
Other Features: Sheeting, quartz stringers (rare)

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a pink-red, medium grained monzonite. It is weakly foliated in places but is generally massive. Jointing follows regular patterns but is intensive, (particularly the horizontal sheeting). Quartz stringers were also observed. This area has limited building stone potential despite the fact that exposure is good and deleterious minerals were not present.

Pink monzonite depicting intensive jointing and good exposure. 86-OLD-013



Extensive vertical and horizontal jointing is exhibited in this picture, along with a pink-coloured weathered surface. 86-OLD-013

BUILDING STONE INVENTORY

Property No. 86-OLD-014

Pluton Name Leggat Lake Granite

Property Name 1 km west of Leggat Lake

Commercial Stone Name Granite

Geological Rock Name Quartz monzonite

Township Olden

Lot 7 mid-south **Con.** 7

NTS 31C/10 **UTM Co-ordinates: Easting** 361200 **Northing** 4953250

Property Status Prospect

Air Photo No. 78-4450 131-47

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pinkish red

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1-3 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike	30 degrees	**Dip**	vertical	**Spacing**	.1 to .5 m
B) Strike	0 degrees	**Dip**	vertical	**Spacing**	.1 to .5 m
C) Strike		**Dip**		**Spacing**	
D) Strike		**Dip**		**Spacing**	

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite; Mafic content: approx. 10%

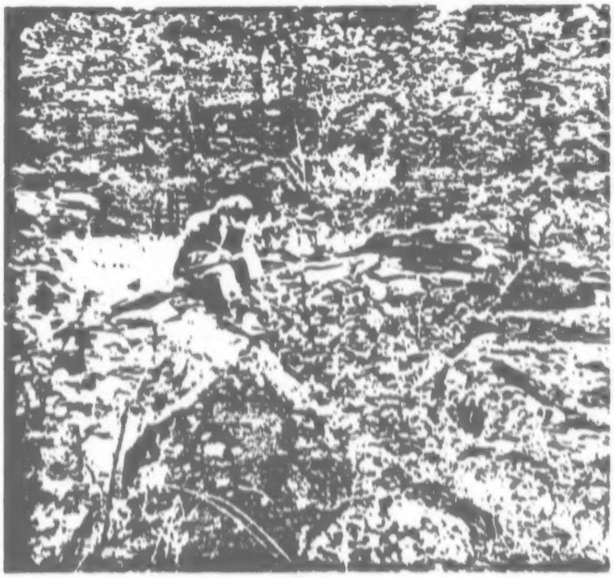
Deleterious Minerals: **Yes** X **No** **Type** Specularite **Percent** Trace

Other Features: Quartz veins, pegmatite dikes, specularite staining, biotite alteration, exfoliation.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This sample is a medium grained, massive quartz monzonite from the Mountain Grove Felsic Intrusion. As seen at other sites in this intrusion, intense irregular jointing is the primary feature which limits building stone development. Other deleterious features include: quartz and pegmatite veins, hematite staining, biotite alteration, exfoliation and poor outcrop exposure.



Light pink quartz monzonite exhibiting exfoliation in the background.
86-OLD-014

MALONE PLUTON

LOCATION: EASTERN MARMORA TOWNSHIP BETWEEN THE VILLAGES OF MALONE AND DELORO
NTS 31C/12 OGS MAP #P.2613
GEOLOGICAL REPORT OFR 5537

SAMPLE SITES: 86-MAR-016

DESCRIPTION OF AREA

Bartlett and Moore (1985, p.75) describe the Malone Pluton as follows:

"The Malone Pluton consists mainly of very fine-grained, porphyritic alkali-feldspar granite, with phenocrysts generally 0.5-1 mm across, of anhedral quartz and subhedral plagioclase and microcline and/or orthoclase and/or perthite. This pluton may be a high level satellite of the Deloro Granite."

The sample site shows intense, irregular jointing, highly variable texture and colour, quartz pods, iron staining, and amphibolite dikes.

CONCLUSIONS

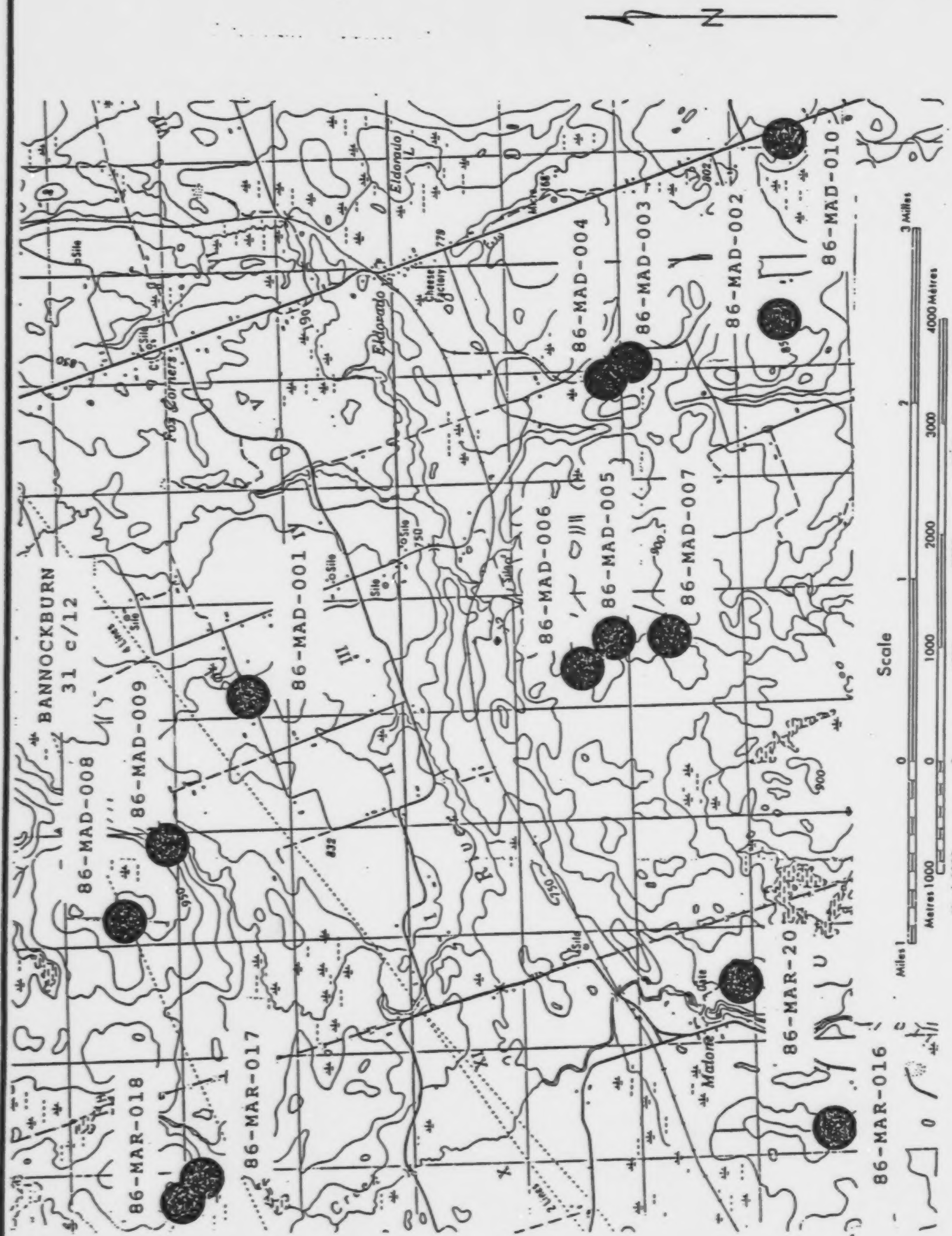
The Malone Pluton has low potential as a building stone prospect.

POTENTIAL

POOR	MODERATE	POOR
86-MAR-016		

REFERENCES

Bartlett, J.R. and Moore, J.M. Jr.
1985: Geology of Belmont, Marmora, and Southern Methuen Townships, Peterborough and Hastings Counties; OGS Open File Report 5537, 236p.


N
BANNOCKBURN
31 c/12
86-MAD-001
86-MAD-002
86-MAD-003
86-MAD-004
86-MAD-005
86-MAD-006
86-MAD-007
86-MAD-008
86-MAD-009
86-MAD-010
86-MAR-016
86-MAR-017
86-MAR-018
86-MAR-20
Eldorado
Eldorado L
Fox Corners
Malone
Cheese factory
Scale
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Metres
Yards 1000
0
1000
2000
3000
4000 Verges

Sample Locations
Malone Pluton

BUILDING STONE INVENTORY

Property No. 86-MAR-016 **Pluton Name** Malone Pluton

Property Name Malone Pluton **Commercial Stone Name** Fine grained granite

Geological Rock Name Microgranite

Township Marmora **Lot** 16 **Con.** 10

NTS 31C/12 **UTM Co-ordinates: Easting** 292200 **Northing** 493637

Property Status Prospect **Air Photo No.** 78-4439-132-71

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Extremely variable - pale pink to dark pink

Weathered Surface Extremely variable - pink to black

Uniform **Variable** X

Weathering Depth:

Grain Size: Fine to medium **Uniform** **Variable** X

Texture: Porphyritic to foliated **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** X **Mod. to Strong** X **Strike** **Dip**

Formed By Alignment of phenocrysts

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, epidote (phenocrysts)

Deleterious Minerals: **Yes** X **No** **Type** Green mineral-possibly epidote **Percent** 10% in porphyry

Other Features: Specularite staining, quartz pods, amphibolite dyke

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: The Malone Pluton contains rocks which are highly variable in mineralogy and texture. Numerous factors make this property a poor building stone prospect. These include: inconsistent mineralogy and texture, quartz pods, specularite staining and the presence of an amphibolite dyke. The intense irregular jointing is the major shortcoming with respect to building stone development in this area.

Assorted samples from centre of Malone Pluton (all within 100^2 m area).
86-MAR-016

MCLEAN GRANITIC PLUTON

LOCATION: SOUTHEAST CORNER OF KENNEBEC TOWNSHIP, SOUTHWEST CORNER OF OLDEN TOWNSHIP, NORTHERN HINCHINBROOKE TOWNSHIP
NTS 31C/10   OGS MAP #2449
GEOLOGIC REPORT #216

SAMPLE SITES: 86-OLD-015, 86-OLD-016, 86-OLD-017, 86-OLD-018, 86-OLD-019, 86-OLD-020, 86-OLD-021, 86-OLD-022, 86-HIN-002, 86-KEN-011, 86-KEN-012

DESCRIPTION OF AREA

The McLean Granitic Pluton is an area composed mainly of granite, quartz monzonite, trondhjemite and granodiorite. Due to poor access most samples were taken from outcrop along the side of the road from the village of McLean to Watson Lake. This area is only a very small part of the pluton and more should be investigated, especially to the west (clos[illegible] to the core of the pluton).

Jointing is generally regular to irregular and intense although areas of moderate jointing occur toward the center of the pluton. Grain size is dominantly medium, grading to coarse toward the core and the texture is massive. The rocks are composed of quartz, plagioclase (probably andesine), orthoclase, microcline and biotite. The only deleterious mineral noticed in the area was specularite.

Deleterious features locally include quartz veins and pods, aplite pods, rare pegmatites, mafic inclusions near the periphery and minor exfoliation. It is important to note that the severity of these features definitely decreases toward the core.

CONCLUSIONS

The most significant potential for building stone occurs near the center of the pluton and should be further investigated. Areas toward the periphery tend to have many mafic or metavolcanic inclusions and show very little potential for building stone.

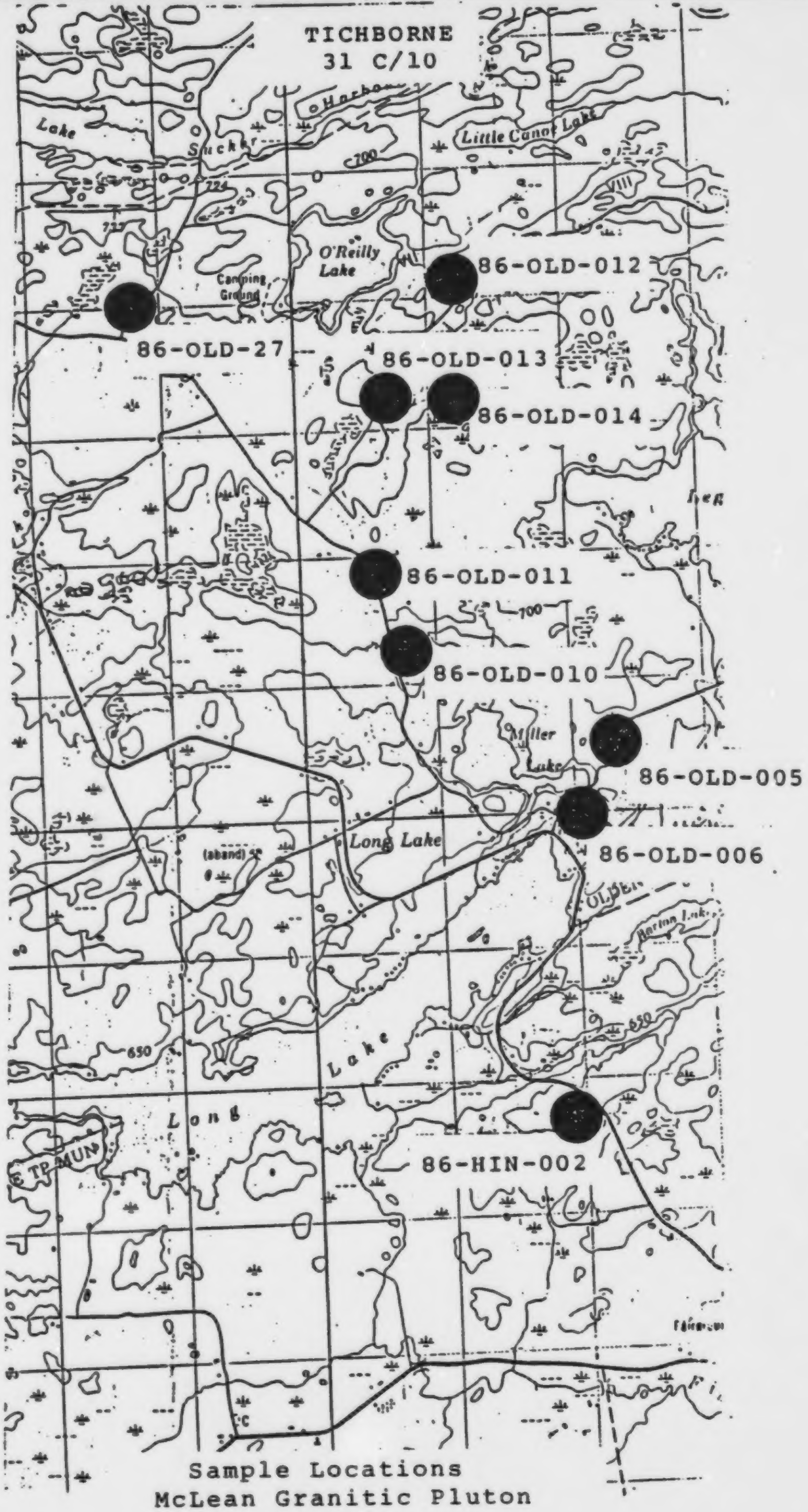
POTENTIAL

POOR	MODERATE	GOOD
86-OLD-015	86-OLD-020	
86-OLD-016	86-OLD-022	
86-OLD-017		
86-OLD-018		
86-OLD-019		
86-OLD-021		
86-HIN-002		
85-KEN-011		
86-KEN-012		

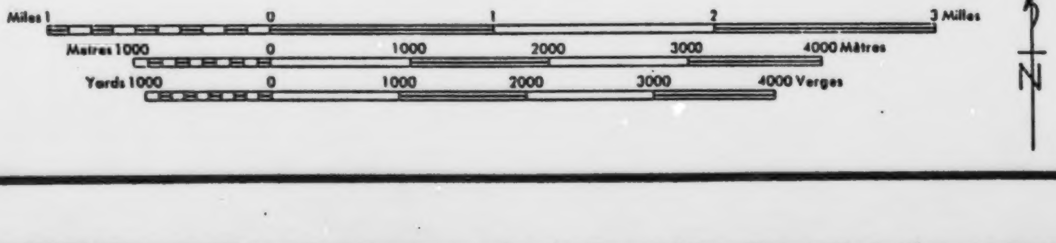
REFERENCES

Harding, W.D.
1951: Geology of the Olden-Bedford Area, Frontenac County, Ontario; Ontario Department of Mines, Annual Report, 1947, Volume 56, Part 6.

Wolff, J.M.
1982: Geology of the Long Lake Area; Ontario Geological Survey, Report 216, 76p. Accompanied by Map 2449, scale 1:31 680 or 1 inch to 1/2 mile.


TICHBORNE
31 C/10
Sucker
Lake
Little Canoe Lake
O'Reilly Lake
Camping Ground
86-OLD-012
86-OLD-27
86-OLD-013
86-OLD-014
86-OLD-011
86-OLD-010
Miller Lake
86-OLD-005
86-OLD-006
Long Lake
(aband)
Long Lake
650
700
86-HIN-002
TP MUN

Sample Locations
McLean Granitic Pluton
(sheet 1)


Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
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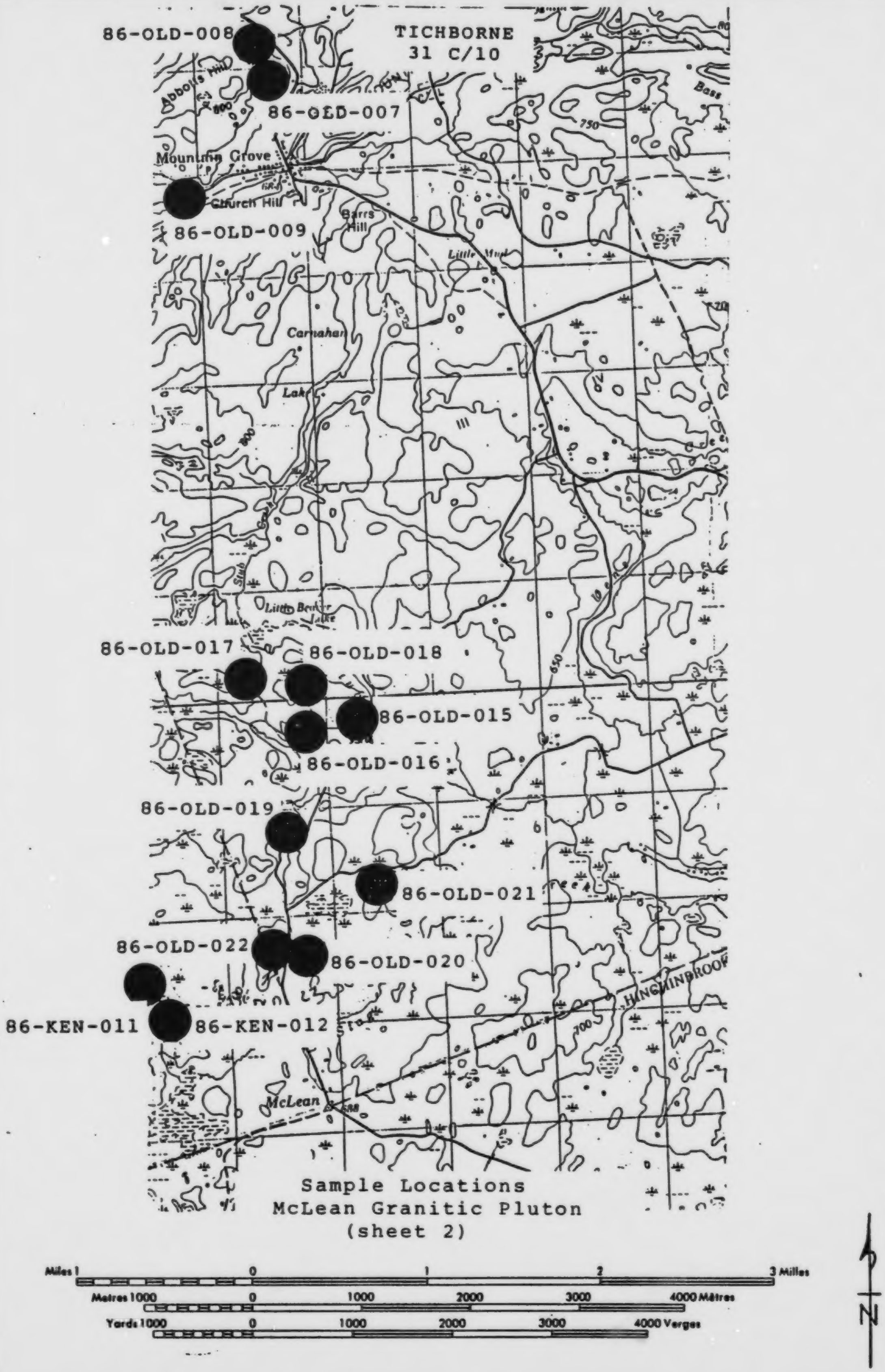
TICHBORNE
31 C/10
86-OLD-008
86-OLD-007
Abbotts Hill
Mountain Grove
Church Hill
Barrs Hill
86-OLD-009
Little Mud
Bass
Carnahan
Lake
Little Beaver Lake
86-OLD-017
86-OLD-018
86-OLD-015
86-OLD-016
86-OLD-019
86-OLD-021
86-OLD-022
86-OLD-020
86-KEN-011
86-KEN-012
HINCHINBROOK
McLean
Miles 1
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1
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Sample Locations
McLean Granitic Pluton
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-OLD-015 **Pluton Name** McLean Pluton

Property Name Watson Lake **Commercial Stone Name** Granite

Geological Rock Name Quartz Monzonite

Township Olden **Lot** 6 **Con.** 2

NTS 31C/10 **UTM Co-ordinates: Easting** 354250 **Northing** 4999740

Property Status Prospect **Air Photo No.** 78-4448-128-51

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern (X) **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 52 degrees **Dip** 76 degrees SE **Spacing** .1-2 m

B) Strike Subhorizontal **Dip** **Spacing** $\leq$ 1/2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz

Deleterious Minerals: **Yes** X **No** **Type** Specularite **Percent** Trace

Other Features: Minor exfoliation, rare mafic inclusions, quartz veins and pods, hematite staining (especially along joint planes).

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a massive, medium grained pink quartz monzonite. It has a fresh appearance and is quite competent. Outcrop exposure is good. This rock contains moderate irregular jointing and numerous deleterious features including: mafic inclusions, quartz veins and pods, hematite staining and exfoliation. These factors diminish building stone potential.

View showing relatively joint free area. Exfoliation here is severe. 86-OLD-015

BUILDING STONE INVENTORY

Property No. 86-OLD-016 **Pluton Name** McLean Pluton

Property Name Little Beaver Lake **Commercial Stone Name** Granite

Geological Rock Name Quartz monzonite

Township Olden **Lot** 6 **Con.** 1

NTS 31C/10 **UTM Co-ordinates: Easting** 353800 **Northing** 4949700

Property Status Prospect **Air Photo No.** 78-4448-128-51

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light Pink

Uniform X **Variable**

Weathering Depth: 1-3 mm

Grain Size: Medium (coarse) **Uniform** **Variable** X

Texture: Prophyritic **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz; Mafic content: approx. 15%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Feldspar, phenocrysts

Possible Uses: Ashlar, paving stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This sample is a porphyritic monzonite to quartz monzonite. The porphyritic texture adds to the appearance of the rock. Few deleterious features were observed, however the area exhibits intense irregular jointing. This rock may have potential for use in a local market.

View showing jointing and benching. Severe exfoliation hampers this site. 86-OLD-016

BUILDING STONE INVENTORY

Property No. 86-OLD-017 **Pluton Name** McLean Pluton

Property Name Little Beaver Lake II **Commercial Stone Name** Granite

Geological Rock Name Quartz monzonite

Township Olden **Lot** 8 **Con.** 1

NTS 31C/10 **UTM Co-ordinates: Easting** 353250 **Northing** 4950200

Property Status Prospect **Air Photo No.** 78-4448-128-51

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: 2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite, amphibole (magnetite); Mafic content: approx. 10%.

Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

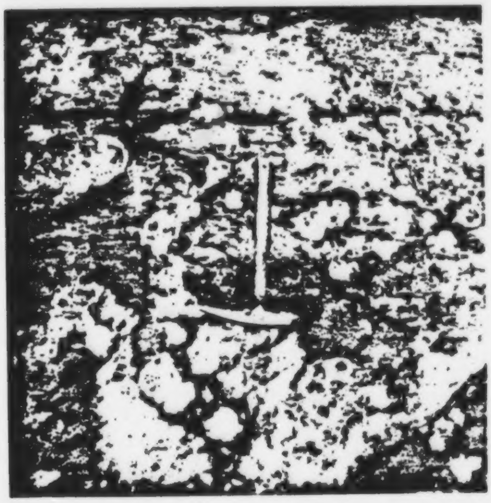
Other Features: Many metavolcanic inclusions around the area.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **X** **Fair** **Poor**

Comments: This sample is a massive, medium grained, pinkish red quartz monzonite. It has a very fresh appearance and contains few deleterious features. (In an area close to this outcrop numerous mafic inclusions were observed.) The principal feature which diminishes building stone potential in this area is the intense irregular jointing.

View showing the severity of both vertical and horizontal jointing. 86-OLD-017



Hammer head rests on mafic xenolith while handle rests on a more granitic zone. 86-OLD-017

BUILDING STONE INVENTORY

Property No. 86-OLD-018 **Pluton Name** McLean Pluton

Property Name Little Beaver Lake 3 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 7 **Con.** 1

NTS 31C/10 **UTM Co-ordinates: Easting** 353800 **Northing** 4950100

Property Status Prospect **Air Photo No.** 78-4448-128-51

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pink

Weathered Surface Light pink/grey

Uniform X **Variable**

Weathering Depth: 3-5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 30 degrees **Dip** Vertical **Spacing** .1 to 1 m

B) Strike 150 degrees **Dip** 70 degrees West **Spacing** .1 to 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite (magnetite)

Deleterious Minerals: Yes No X Type **Percent**

Other Features: Granitic stringers, granite/metavolcanic contact approximately 300 m to the west of this site.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: This rock is a pink, massive, medium grained granite of the McLean Pluton. The rock is competent and has a very fresh appearance. It contains a few quartz stringers and mafic inclusions were observed nearby. The intense jointing diminishes the building stone potential at this site.

General view of outcrop. Note extensive sheeting above hammer.
86-OLD-018

BUILDING STONE INVENTORY

Property No. 86-OLD-019 **Pluton Name** McLean Pluton

Property Name Watson Lake-South-West **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 5 **Con.** 1

NTS 31C/10 **UTM Co-ordinates: Easting** 353600 **Northing** 4948750

Property Status Prospect **Air Photo No.** 78-4448-128-51

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Whitish pink

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Fine to coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 140 degrees **Dip** 60 degrees SW **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite (magnetite) Mafic content: approx. 8%

Deleterious Minerals: Yes X **No** **Type** Hematite staining **Percent** Trace

Other Features: Hematite staining, aplite and pegmatite dykes, alteration of mafics.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This is a reddish-pink, massive granite which contains some feldspar phenocrysts. The mafics (and possibly the feldspars) show signs of alteration in hand specimen. The fresh surface of this rock has a granular appearance. Jointing follows regular patterns but the joints are closely spaced and oblique. Other deleterious features include hematite staining (abundant) and pegmatite and aplite dikes.

Granite pavement is fairly extensive at this site. Note sheeting and jointing. Hammer is resting on an aplite dike.
86-OLD-0019

BUILDING STONE INVENTORY

Property No. 86-OLD-020 **Pluton Name** McLean Pluton

Property Name 1.5 km N. of McLean **Commercial Stone Name** Granite

Geological Rock Name Quartz Monzonite

Township Olden **Lot** 3 **Con.** 1

NTS 31C/10 **UTM Co-ordinates: Easting** 353650 **Northing** 4947650

Property Status Prospect **Air Photo No.** 78-4447-130-107

Production History Nil

Use of Explosives: Yes X **No** **Type** Roadcut nearby

Colour: Fresh Surface Pink

Weathered Surface Light pink with grey

Uniform X **Variable**

Weathering Depth: 2-3 mm

Grain Size: Coarse/medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 105 degrees **Dip** ? **Spacing** 1-3 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Moderate-fair

Mineralogy: Biotite, plagioclase, quartz, k-spar

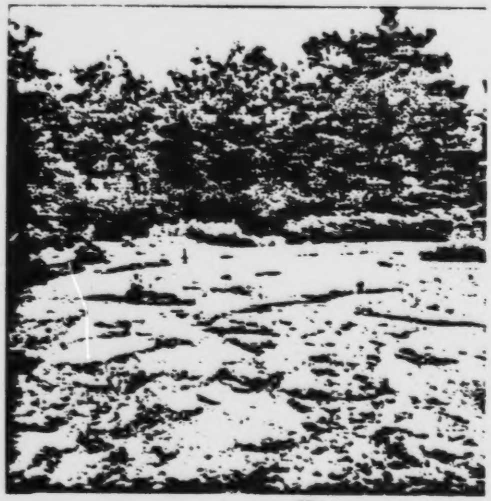
Deleterious Minerals: Yes X **No** **Type** Hematite **Percent** Trace

Other Features: Hematite staining, exfoliation

Possible Uses: Small building stone, ashlar, paving stone

Outcrop Exposure: Good X **Fair** X to **Poor**

Comments: The rock is a very fresh, massive, pink quartz monzonite. The quartz, plagioclase and k-spars all exhibit phenocrysts in uniform concentrations. A small amount of hematite staining was observed on joint faces. This area should further be investigated.



Vast flat outcrop with limited jointing. Exfoliation is severe in some spots. 86-OLD-020

BUILDING STONE INVENTORY

Property No. 86-OLD-021 **Pluton Name** McLean Pluton

Property Name Stag Creek **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 3 **Con.** 2

NTS 31C/10 **UTM Co-ordinates: Easting** 354400 **Northing** 4948250

Property Status Prospect **Air Photo No.** 78-4447-130-109

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pink-black specks

Weathered Surface Dull Pink

Uniform X **Variable**

Weathering Depth: ≤ 1 cm

Grain Size: Medium to coarse **Uniform** **Variable** X

Texture: Massive to foliated **Uniform** **Variable** X

Fabric: **Yes** X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Alignment of biotite

Bedding: **Yes** **No** **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike 80 degrees **Dip** 90 degrees **Spacing** .3-2 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite; Mafic content: approx. 25-30%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Aplite dykes, mafic inclusions

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a dark pink granite which has a slightly inconsistent grain size and texture. Aplite dikes and mafic inclusions (max. 15 cm wide) are also present in this rock. Jointing and sheeting is intensive. These factors tend to diminish building stone potential in this area.

Overall view of outcrop exhibiting reasonable exposure and some jointing.
86-OLD-021

BUILDING STONE INVENTORY

Property No. 86-OLD-022 **Pluton Name** McLean Pluton

Property Name Road Side **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 3 **Con.** 1

NTS 31C/10 **UTM Co-ordinates: Easting** 353450 **Northing** 4947650

Property Status Prospect **Air Photo No.** 78-4446-119-103

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish brown

Weathered Surface Light pink

Uniform **Variable** X

Weathering Depth: 0.5 cm

Grain Size: Medium **Uniform** **Variable** X

Texture: Slightly foliated to gneissic **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** X **to** **Mod.** **Strong** X **Strike** **Dip**

Formed By Alignment of biotite, gneissic banding

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, biotite, quartz

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

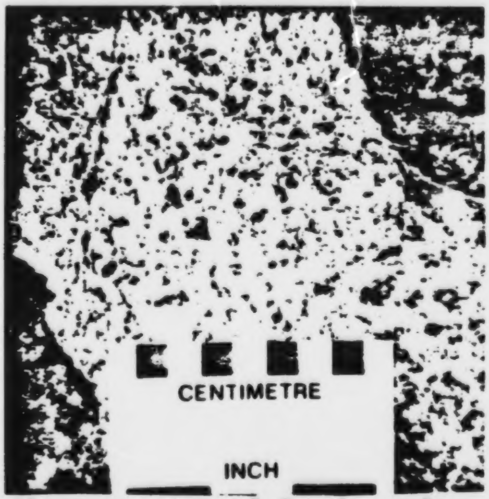
Other Features: Rare aplite dikes (to 10 cm wide), poor horizontal exposure, veins of more siliceous material present (to 0.5 m wide), large outcrop area, exfoliation on the 10 cm to 0.5 m scale.

Possible Uses: Small building stone, ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This site has a large outcrop exposure and moderate vertical jointing. However, numerous veins (aplite, quartz-rich and coarse felsic) at various attitudes, exfoliation, and texture which varies from weakly foliated to gneissic at the outcrop scale limit the building stone potential of this site.

Flat outcrop area with limited jointing. Sheeting may be severe in some areas. 86-OLD-022



Close-up view of fresh surface showing grain size. 86-OLD-022

BUILDING STONE INVENTORY

Property No. 86-HIN-002 **Pluton Name** McLean Pluton

Property Name Long Lake **Commercial Stone Name** Granite

Geological Rock Name Quartz monzonite

Township Hinchinbrooke **Lot** 28 **Con.** 4

NTS 31C/10 **UTM Co-ordinates: Easting** 361900 **Northing** 4947750

Property Status Prospect **Air Photo No.** 78-4447 130-1177

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink & Grey

Uniform **Variable** X

Weathering Depth: 2-5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod.** X **Strong Strike** 70 degrees **Dip**

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 160 degrees **Dip** **Spacing** 2-3 m

B) Strike 20 degrees **Dip** **Spacing** 2-3 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz

Deleterious Minerals: Yes **No** X **Type** **Percent**

Other Features: Large aplite dykes (to 3 m wide), quartz veins.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This is a medium grained, moderately foliated pink quartz monzonite. This site is near the eastern perimeter of the McLean Pluton. Jointing here is intense and occurs in regular and irregular joint patterns. Quartz veins and aplite dikes were also observed in the area. Outcrop exposure is extensive.

General appearance of outcrop showing weathering and jointing. The rock hammer is resting on a quartz stringer. 86-HIN-002

Outcrop face exhibiting sheeting and horizontal jointing. Note hammer in light patch at lower left for scale. 86-HIN-002

BUILDING STONE INVENTORY

Property No. 86-KEN-011 **Pluton Name** McLean Pluton

Property Name McLean - Kennebec Twp. #1 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Kennebec **Lot** 3 **Con.** 10

NTS 31C/10 **UTM Co-ordinates: Easting** 352050 **Northing** 4947400

Property Status Prospect **Air Photo No.** 78-4446-119-102

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brownish pink

Weathered Surface Bleached pink to grey

Uniform **Variable** X

Weathering Depth:

Grain Size: Medium to coarse **Uniform** **Variable** X

Texture: Massive to porphyritic **Uniform** **Variable** X

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite (amphibole)

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

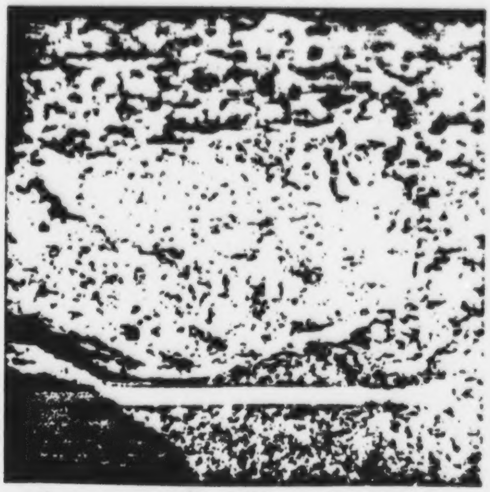
Other Features: Rare pegmatite dikes, rare pegmatite pods, areas of coarse grained granite relatively common.

Possible Uses: Crushed stone

Outcrop Exposure: **Good** X to **Fair** X **Poor**

Comments: This site is fairly typical of outcrop mineralogy, texture, and jointing near the core of the McLean Pluton. The outcrop exposure at this site is good and it is easily accessible. The major deleterious features of this rock are the variable grain size and irregular jointing. Vertical jointing is not predominant, however horizontal exfoliation is present on the 5 to 10 cm scale. The grain size was found to be quite variable even at the hand speciman scale.

Vertical jointing not prominent but horizontal jointing and exfoliation are common.
86-KEN-011



Close-up of medium grained granite. 86-KEN-011

BUILDING STONE INVENTORY

Property No. 86-KEN-012 **Pluton Name** McLean Pluton

Property Name Beaver Pond **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Kennebec **Lot** 2 **Con.** 10

NTS 31C/10 **UTM Co-ordinates: Easting** 352400 **Northing** 4947100

Property Status Prospect **Air Photo No.** 79-4447-130-107

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink to black

Uniform **Variable** X

Weathering Depth: 3-4 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, biotite, quartz, plagioclase

Deleterious Minerals: **Yes** X **No** **Type** Biotite in clumps **Percent** Rare

Other Features: Mafic-rich areas (clumps of biotite crystals)

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a massive, medium grained, pink granite. The grain size is more consistent than at sites closer to the intrusion center and pegmatite phases were not observed. However, the rock at this site contains knots of biotite crystals (maximum observed were 4 cm in diameter). The jointing is not as intense as found towards the intrusion centre but occurs in irregular patterns. Outcrop exposure is poor. These factors diminish the building stone potential for this rock.

Relatively intense horizontal jointing and generally poor exposure characterize this area.
86-KEN-012

METHUEN TRONDHJEMITE AND BELMONT GRANITE

LOCATION: A 3 TO 4 KM-WIDE BODY EXTENDING FROM THE SW CORNER TO THE NE CORNER OF METHUEN TOWNSHIP. A SMALLER BODY STRADDLING THE BELMONT-METHUEN TOWNSHIP BOUNDARY IS GROUPED WITH THE METHUEN TRONDHJEMITE. IT IS REFERRED TO AS THE BELMONT GRANITE BY BARTLETT AND MOORE (1985).
NTS 31C/5, 12, 13   OGS MAP #1960E, P.2613
GEOLOGICAL REPORT #ODM VOL.69, PART 8; OFR 5537

SAMPLE SITES: 86-BEL-001, 86-MET-001

DESCRIPTION OF AREA:

The Methuen trondhjemite, referred to by Hewitt (1961, pg. 111) as the Methuen granite, is described as follows:

"The largest granitic intrusive is the Methuen granite, which consists mainly of medium-to coarse-grained pink gneissic biotite granite. Some facies are pink biotite granite porphyry with large feldspar phenocrysts (up to 1 inch). A grey, fine- to medium-grained biotite granodiorite occurs as large inclusions in the Methuen granite."

The smaller granitic body south of the Methuen trondhjemite (Belmont Granite) is described by Bartlett and Moore as fine- to coarse-grained leucogranite, porphyritic granite, quartz monzonite, and granodiorite.

Both are considered to be late tectonic intrusions. The Methuen, at sample site 86-MET-001, is foliated with regular, but intense, jointing. The Belmont site is located at the old Fairmont granite quarry and shows a massive texture with moderate, regular jointing, but intense horizontal microfracturing.

CONCLUSIONS

The building stone potential of the Belmont granite and the Methuen trondhjemite at the sites examined is low but investigation of other parts of the intrusions are warranted based on the regular jointing.

POTENTIAL

POOR	MODERATE	GOOD
86-BEL-001 86-MET-001		

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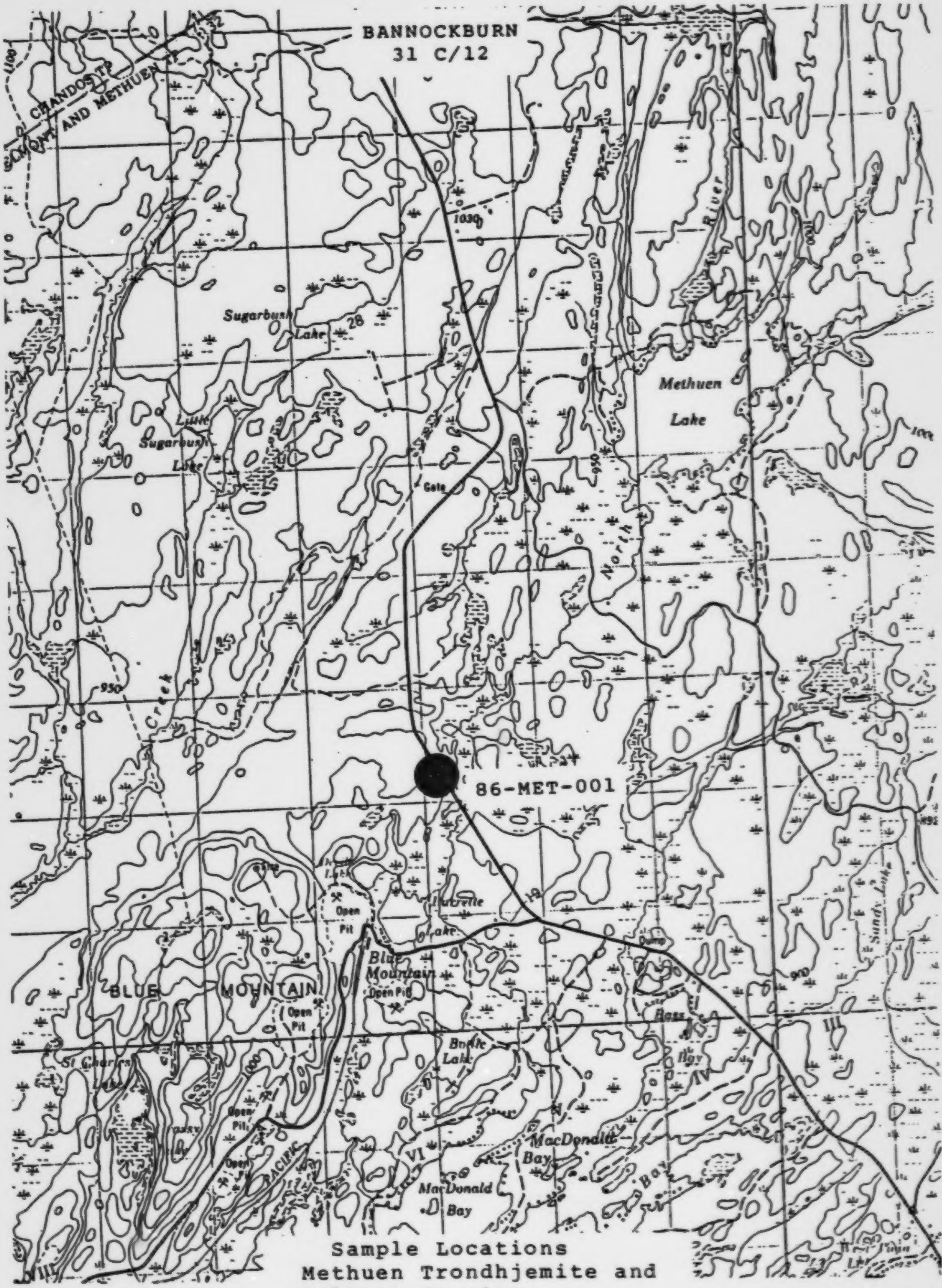
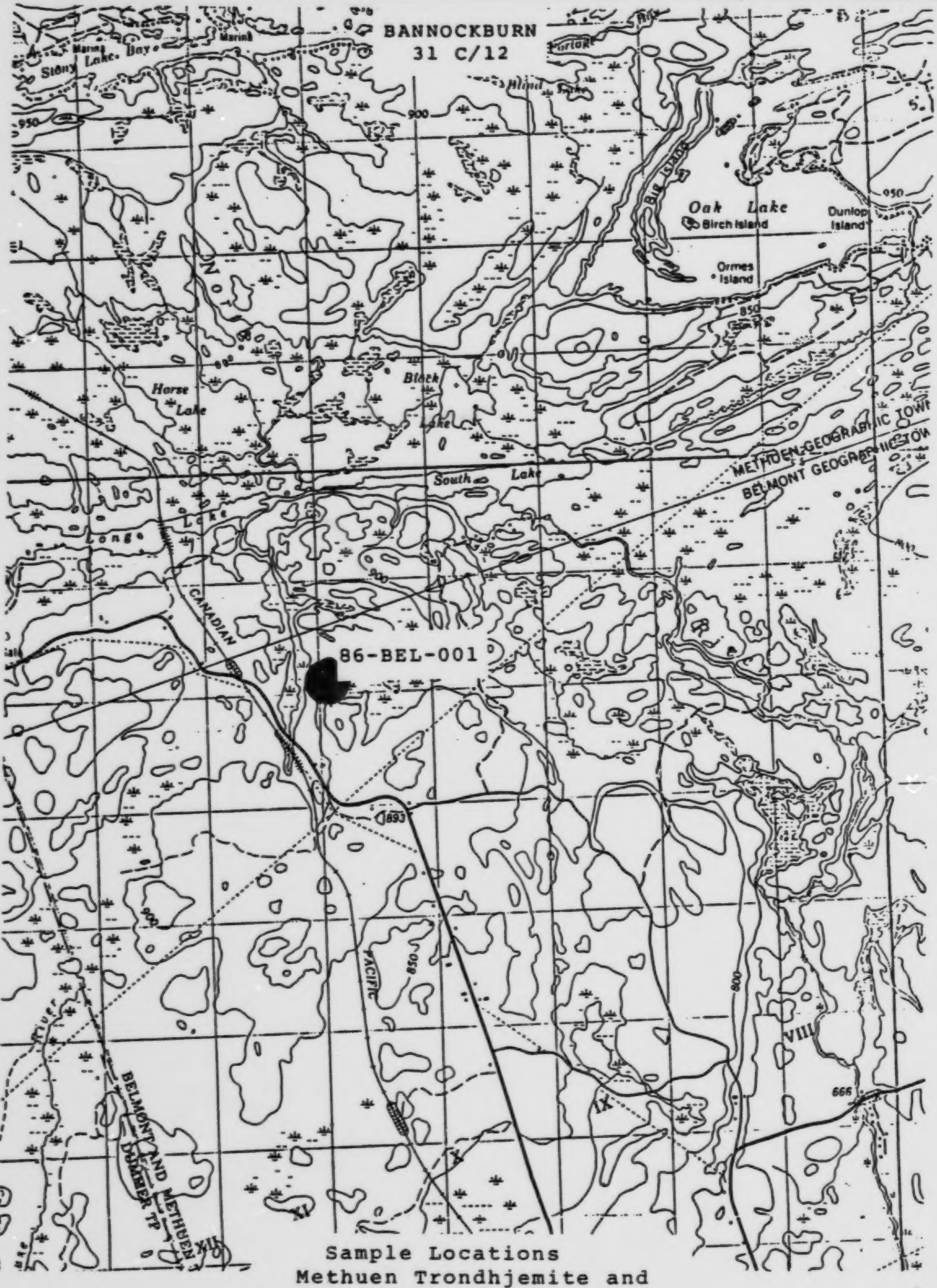

BANNOCKBURN
31 C/12
CHANDOS TP
BELMONT AND METHUEN
Sugarbush Lake
Little Sugarbush Lake
Methuen Lake
North River
Creek
Gate
86-MET-001
Open Pit
Blue Mountain
BLUE MOUNTAIN
Lake
St Charles Lake
Bottle Lake
Bass Bay
MacDonald Bay
Sandy Lake
PACIFIC
1030
950
28
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Methuen Trondhjemite and
Belmont Granite
(sheet 1)


BANNOCKBURN
31 C/12
Stony Lake Bay
Oak Lake
Birch Island
Dunlop Island
Ormes Island
Horse Lake
Black Lake
South Lake
Long Lake
CANADIAN
PACIFIC
METHUEN GEOGRAPHIC TOWNSHIP
BELMONT GEOGRAPHIC TOWNSHIP
BELMONT AND METHUEN
DUMMER TP
86-BEL-001
950
900
850
800
893
666
VIII
IX
X
XI
XII
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Methuen Trondhjemite and
Belmont Granite
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-BEL-001 **Pluton Name** Methuen Trondhjemite

Property Name Fairmont Granite **Commercial Stone Name** Granite

Geological Rock Name Pink Granite

Township Belmont **Lot** 31 **Con.** 10

NTS 31C/05 **UTM Co-ordinates: Easting** 265100 **Northing** 4938100

Property Status Inactive **Air Photo No.**

Production History Fairmont granite quarry

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface Pink

Weathered Surface Brownish to black

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing X **Moderate Jointing** **Intensive Jointing**

A) Strike 130 degrees **Dip** **Spacing** 3-4 m

B) Strike 50 degrees **Dip** **Spacing** 1.5 m

C) Strike **Dip** horizontal **Spacing** <.5 m fracturing

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Good

Mineralogy: K-spar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

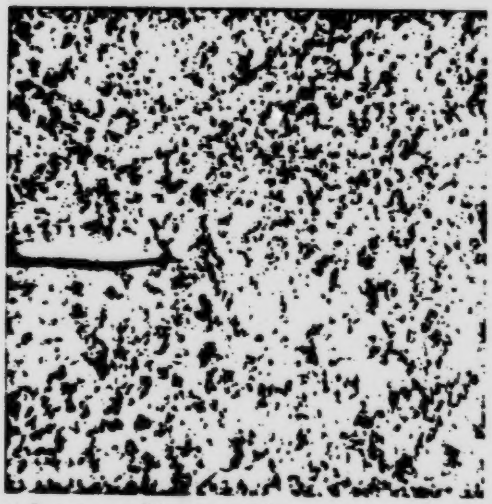
Other Features: Minor quartz veining < 1 cm, some biotite pods, some areas of quarry show extensive sheeting and discontinuous horizontal fractures.

Possible Uses: Crushed stone, ashlar, curbing stone.

Outcrop Exposure: Good X Fair Poor

Comments: This site showed very good potential in terms of colour, texture, vertical jointing and lack of deleterious minerals. However, after development of the quarry had started, a pervasive, intense, horizontal microfracturing was observed, probably related to sheeting. These fractures are more apparent on a polished surface and diminish the structural integrity of the stone, thereby limiting the building stone potential.

Overall view of Fairmont granite quarry, note limited jointing. 86-BEL-001



Uniform medium grain size and pink colour. 86-BEL-001

BUILDING STONE INVENTORY

Property No. 86-MET-001 **Pluton Name** Methuen Trondjemite

Property Name Blue Mountain **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Methuen **Lot** 21 **Con.** 5

NTS 31C/12-31C/13 **UTM Co-ordinates: Easting** 267150 **Northing** 4952250

Property Status Roadside Rockcut **Air Photo No.**

Production History 34.7 km north of Havelock on the way to Lasswade. (County Road #46)

Use of Explosives: Yes X **No** **Type** High Velocity

Colour: Fresh Surface Dark pink

Weathered Surface Light greyish pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Foliation - alignment of mafics

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike Horizontal **Dip** **Spacing** ≤ 1 m

B) Strike 51 degrees **Dip** Vertical **Spacing** ≤ 1 m

C) Strike 125 degrees **Dip** Vertical **Spacing** 1-1.5 m

D) Strike 150 degrees **Dip** Vertical **Spacing** ≤ 1 m

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, biotite, quartz

Deleterious Minerals: **Yes** X **No** **Type** **Percent**

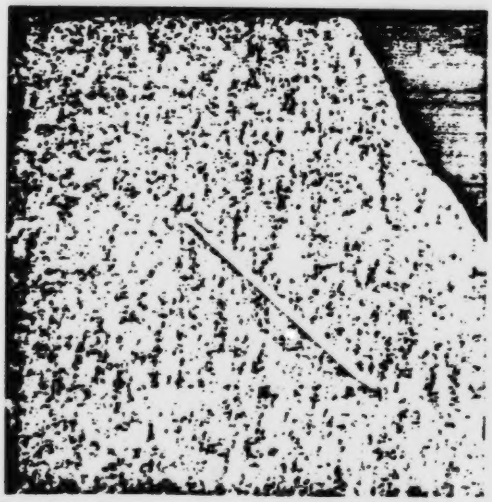
Other Features: Pegmatite banding, extensive sheeting, hematite staining on fractures.

Possible Uses: Crushed stone, ashlar, curbing stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This site shows very limited potential for building stone due to abundant pegmatite dykes which reduce the potential size of quarry blocks. The rock has a strongly foliated appearance due to the alignment of biotite. The grain size is medium and the colour on the fresh surface is a dark pink. The area displays extensive sheeting and also horizontal jointing of up to 1 m. This site is a roadcut in the granite within 300 m of the contact with metasediments. Any further investigation of this pluton should be conducted further to the south.

Good outcrop exposure showing vertical and horizontal joint sets. 86-MET-001



Dark pink granite showing foliated texture and medium grain size. 86-MET-001

MOUNT MORIAH SYENITE

LOCATION: South-west corner of Grimsthorpe township and extreme north-west corner of Elzevir township.
NTS 31C/11 OGS MAP #51D
GEOLOGICAL REPORT# AR 51, PT. 4

SAMPLE SITES: 86-ELZ-010, 86-ELZ-011, 86-ELZ-012, 86-GRI-001, 86-GRI-002, 86-GRI-003, 86-GRI-004, 86-GRI-005

DESCRIPTION OF AREA

Only one rock type has been encountered to date on Mount Moriah. This is brown, medium to coarse grained, massive syenite consisting predominantly of K-spar and hornblende (mostly pyroxene according to Brown and Thivierge, 1979). The area examined comprises the SE quarter of the intrusion.

The SW margin of the intrusion is identified as a mafic (biotite)-poor syenite late phase (Brown and Thivierge, 1979) occurring as an arcuate mass whereas the remainder of the intrusion is considered an augite/(hornblende) syenite early phase.

CONCLUSIONS

The Mount Moriah syenite shows promise for building stone potential in terms of uniform colour, texture and limited to moderate jointing (exposed 10-30 meter surface areas can be found). However, horizontal jointing (<0.5-5.0 m) and poor access are limiting factors. Some potential for large quarry blocks may be realized (GRI-005), as well as curbing and possibly architectural stone (GRI-004, GRI-003, GRI-002) and rarely, (if finer-grained) monumental stone.

POTENTIAL

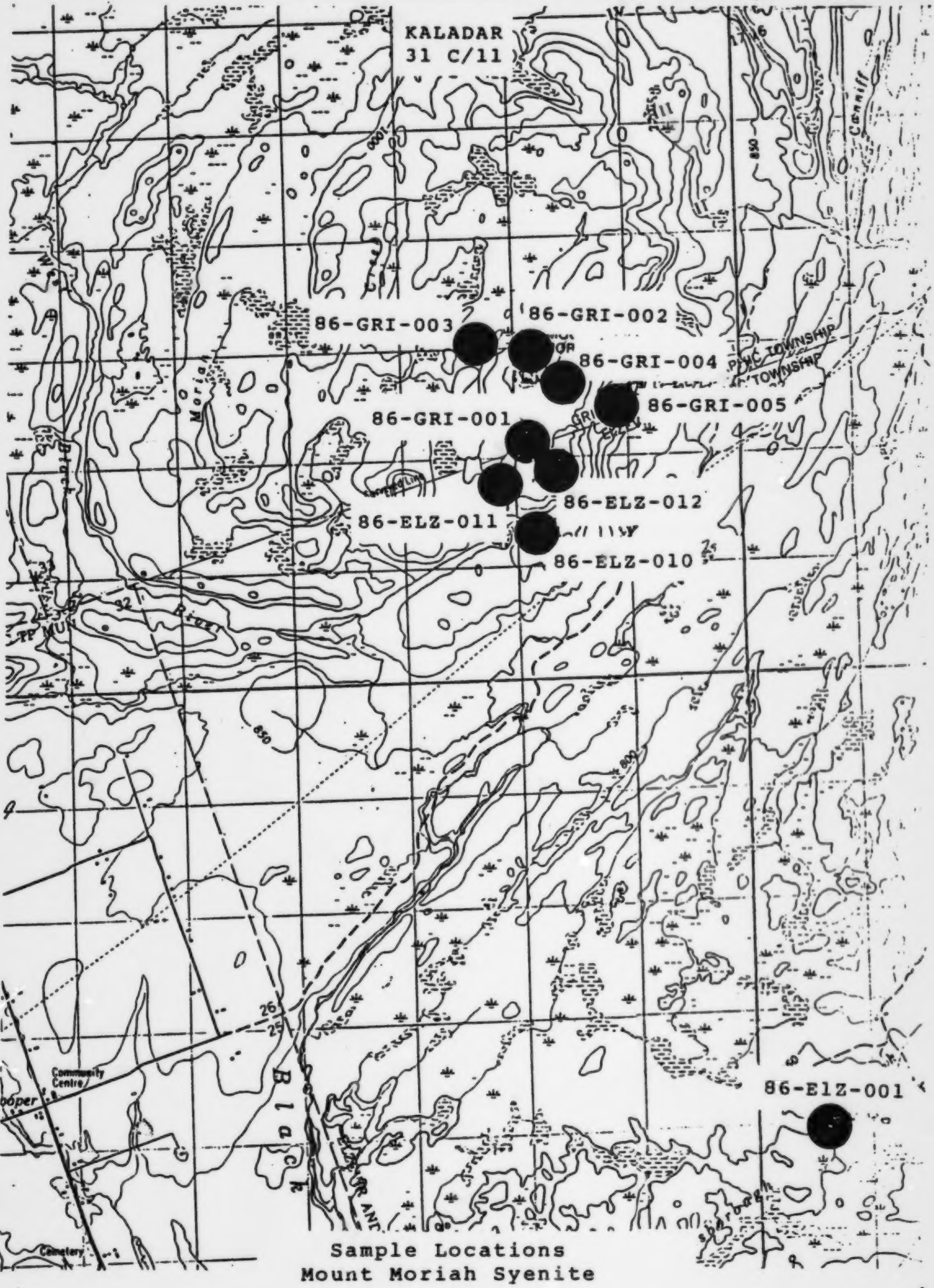
POOR		MODERATE	GOOD
86-ELZ-010	86-ELZ-011		
86-ELZ-012	86-GRI-001		
	86-GRI-002		
	86-GRI-003		
	86-GRI-004		
			86-GRI-005

REFERENCES

Brown, P.A. and Thivierge, R.
1979: A Preliminary Report on the Mount Moriah Granite, Geological Survey of Canada, Energy, Mines and Resources Canada, for Atomic Energy Canada Ltd., Technical Record - TR-15, 22p.

Hewitt, D.F.
1968: Geology of Madoc Township and the North Part of Huntingdon Township, Hastings County; ODM Geological Report 73.

Meen, V.B., and Harding, W.D.
1942: Grimsthorpe-Kennebec Area, Counties of Hastings, Lennox and Addington, and Frontenac, Ontario; Ontario Department of Mines, Map 51D, scale 1 inch to 1 mile.


KALADAR
31 C/11
86-GRI-003
86-GRI-002
86-GRI-004
86-GRI-005
86-GRI-001
86-ELZ-012
86-ELZ-011
86-ELZ-010
86-ElZ-001
Moriah
River
Community Centre
Cooper
Cemetery
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Mount Moriah Syenite

BUILDING STONE INVENTORY

Property No. 86-ELZ-010 **Pluton Name** Mt. Moriah Syenite

Property Name The Flats-1 (Mount Moriah) **Commercial Stone Name** Granite

Geological Rock Name Quartz Syenite

Township Elzevir **Lot** 31 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 303150 **Northing** 4951300

Property Status Prospect **Air Photo No.** 78-4445-157-229

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Grey-brown

Weathered Surface Grey-brown

Uniform X **Variable**

Weathering Depth: ≤ 1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike	300 degrees	**Dip**	60 degrees NE	**Spacing**	0.5-1.0 m
B) Strike	025 degrees	**Dip**	90 degrees	**Spacing**	1.0-3.0 m
C) Strike	Horizontal	**Dip**		**Spacing**	0.3-1.0 m
D) Strike		**Dip**		**Spacing**	

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, k-spar, amphibole, biotite, quartz

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

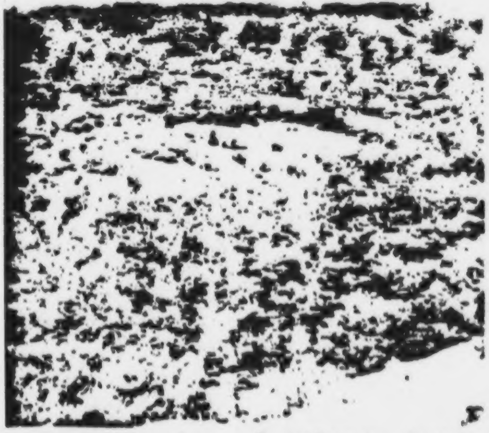
Other Features: Nil

Possible Uses: Ashlar, paving stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a massive, medium grained, dark brown, quartz syenite. The feldspars are slightly altered to clay minerals. The outcrop exposure at this site is extensive, however, the poor access and intense irregular jointing limit the building stone potential of the area.

Close-up of weathered surface exhibiting moderate to extensive jointing. 86-ELZ-010



Overall view of outcrop area showing good outcrop exposure. 86-ELZ-010

Regular horizontal sheeting along with vertical joint sets. 86-ELZ-010

BUILDING STONE INVENTORY

Property No. 86-ELZ-011 **Pluton Name** Mt. Moriah Syenite

Property Name The Flats-2 (Mount Moriah) **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Elzevir **Lot** 32 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 337850 **Northing** 4951750

Property Status Prospect **Air Photo No.** 78-4449-157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Reddish brown

Weathered Surface Brownish grey

Uniform X **Variable**

Weathering Depth: ≤ 1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing X **Moderate Jointing** **Intensive Jointing**

A) Strike Horizontal **Dip** **Spacing** 1.0-1.5 m

B) Strike 126 degrees **Dip** 90 degrees **Spacing** 1.0 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to fair

Mineralogy: Feldspar, biotite, amphibole

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Nil

Possible Uses: Some quarry blocks may be viable.

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: The Mount Moriah Syenite at this location is medium grained, reddish brown in colour and massive. Few deleterious features were observed in this rock and jointing occurred in regular sets with moderate spacing. The limited access and poor outcrop exposure are two factors which reduce building stone potential for this area.

Overall outcrop exposure showing limited jointing. 86-ELZ-011

BUILDING STONE INVENTORY

Property No. 86-EL2-012 **Pluton Name** Mt. Moriah Syenite

Property Name Mount Moriah-Benchmark 1215 **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Elzevir **Lot** 32 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 308300 **Northing** 4951850

Property Status Prospect **Air Photo No.** 78-4449-157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey-brown

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern (X) **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** (X)

Intense **A) Strike** Horizontal **Dip** **Spacing** ≤ 0.5 m

Weak **B) Strike** 120 degrees **Dip** Steep (W) **Spacing** 1.0-3.0 m

Local **C) Strike** 060 degrees **Dip** 90 degrees **Spacing** Wide (5-10 m)

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, amphibole, biotite; Mafic content: approx. 20%

Deleterious Minerals: Yes **No** X **Type** **Percent**

Other Features: Occasional felsic stringers (average 4 cm wide), slight amphibole alteration.

Possible Uses: Paving stone, ashlar

Outcrop Exposure: **Good X Fair Poor**

Comments: This sample is a medium grained, massive, brown syenite. The amphibole in this rock is slightly altered to chlorite. Intense horizontal jointing and poor access are the principal factors which limit building stone potential in this area.

Overall view of outcrop area showing good exposure. 86-ELZ-012

BUILDING STONE INVENTORY

Property No. 86-GRI-001

Pluton Name Mt. Moriah Syenite

Property Name Fools Lake (Mount Moriah)

Commercial Stone Name Granite

Geological Rock Name Syenite

Township Grimsthorpe

Lot 23 **Con.** 1

NTS 31C/11 **UTM Co-ordinates: Easting** 308100 **Northing** 4952150

Property Status Prospect

Air Photo No. 78-4449-157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brown

Weathered Surface Grey-brown

Uniform X **Variable**

Weathering Depth: 1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing (X) **Moderate Jointing** X **Intensive Jointing**

A) Strike 150 degrees **Dip** 30 degrees E **Spacing** 0.3-0.8 m

B) Strike 122 degrees **Dip** 90 degrees **Spacing** 1.5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair to poor

Mineralogy: Feldspar, hornblende, biotite; Mafic content: approx. 25%

Deleterious Minerals: Yes **No** X **Type** **Percent**

Other Features: Three 1-3 cm wide felsic stringers observed.

Possible Uses: Some quarry blocks for architectural stone may be feasible.

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a medium grained, massive, brown syenite. Vertical jointing occurs in regular joint sets with moderate spacing, however, the horizontal jointing was observed to be more closely spaced. At this time, access to the Mount Moriah syenite is poor. The presence of rare felsic stringers further limited building stone potential for this area.

Horizontal jointing (2.0 m spacing).
86-GRI-001

Large sheet possible 1 m thick.
86-GRI-001

BUILDING STONE INVENTORY

Property No. 86-GRI-002

Pluton Name Mt. Moriah Syenite

Property Name Firetower-Benchmark 1215' (Mount Moriah)

Commercial Stone Name Granite

Geological Rock Name Syenite

Township Grimsthorpe

Lot 22 **Con.** 1

NTS 31C/11 **UTM Co-ordinates: Easting** 308200 **Northing** 4952900

Property Status Prospect

Air Photo No. 78-4449-157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brown

Weathered Surface Grey-brown

Uniform X **Variable**

Weathering Depth: 1/2 cm

Grain Size: Medium (to coarse) **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 105 degrees **Dip** 90 degrees **Spacing** 1.0-2.0 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, amphibole, biotite; **Mafic content:** approx. 25%

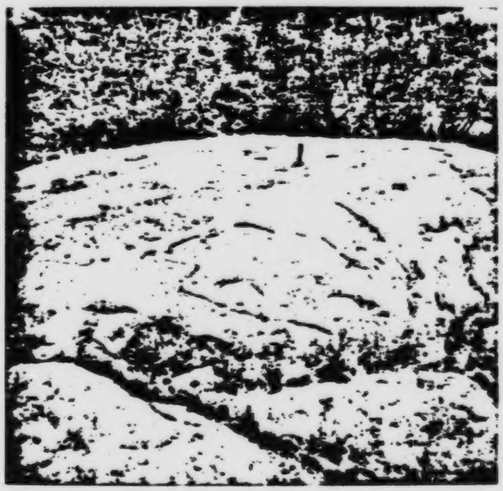
Deleterious Minerals: Yes X **No Type** Hematite observed along one fracture plane **Percent** Trace

Other Features: One 1 cm wide felsic stringer observed, shallow (1 cm thick) exfoliation patches (average 1/2 square meter)

Possible Uses: Curbing stone, some architectural stone

Outcrop Exposure: Good X **Fair** **Poor**

Comments: This sample is a medium grained, massive syenite. Hematite stained joint planes and a felsic stringer were observed. Jointing is moderately spaced and generally occurs in regular sets. Access to this area is poor.



General appearance of joint-free area.
Note surface exfoliation patches.
86-GRI-002

BUILDING STONE INVENTORY

Property No. 86-GRI-003 **Pluton Name** Mt. Moriah Syenite

Property Name Gypsy Moth Hill (Mount Moriah) **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Grimsthorpe **Lot** 23 **Con.** 2

NTS 31C/11 **UTM Co-ordinates: Easting** 307600 **Northing** 4953000

Property Status Prospect **Air Photo No.** 78-4449-157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brown

Weathered Surface Grey-brown

Uniform X **Variable**

Weathering Depth: 1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

Subhorizontal Benches	**A) Strike** 010 degrees	**Dip** 20 degrees E	**Spacing** ≤ 1 m
	B) Strike 156 degrees	**Dip** 90 degrees	**Spacing** 1 m
	C) Strike	**Dip**	**Spacing**
	D) Strike	**Dip**	**Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, amphibole, minor pyroxene

Deleterious Minerals: Yes X **No** **Type** Sulphides **Percent** Trace

Other Features: Limited to moderate felsic stringers (average 1 cm wide); one 10 cm wide pegmatite stringer observed; ≤ 1 cm thick surface exfoliation patches (surface weathering/peeling).

Possible Uses: Curbing stone, possibly architectural stone

Outcrop Exposure: **Good X Fair Poor**

Comments: This is a massive, medium grained, brown syenite. Grain size, colour and texture are uniform throughout the outcrop and surface exposure is good. Regular joint patterns with moderate spacing were observed. Horizontal jointing predominates. The building stone potential of this rock is limited primarily by the presence of felsic stringers and exfoliation.

General appearance of joint-free patches. Average 1 m thick sheets dipping shallowly east. 86-GRI-003

Average 1 m thick benches (sub horizontal sheeting). 86-GRI-003

BUILDING STONE INVENTORY

Property No. 86-GRI-004 **Pluton Name** Mt. Moriah Syenite

Property Name Road Top (east of Mt. Moriah Firetower) **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Grimsthorpe **Lot** 22 **Con.** 1

NTS 31C/11 **UTM Co-ordinates: Easting** 308450 **Northing** 4952700

Property Status Prospect **Air Photo No.** 78-4448-157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brown

Weathered Surface Grey-brown

Uniform X **Variable**

Weathering Depth: 1/2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing X **Moderate Jointing** X **Intensive Jointing**

Subhorizontal Benches (Sheeting)	**A) Strike** 010 degrees	**Dip** 10 degrees E	**Spacing** 1.0 m (avg.) see photo	
	B) Strike 115 degrees	**Dip** 90 degrees	**Spacing** 1.0-5.0 m	
	C) Strike	**Dip**	**Spacing**	
	D) Strike	**Dip**	**Spacing**	

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Feldspar, amphibole, biotite, minor pyroxene

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

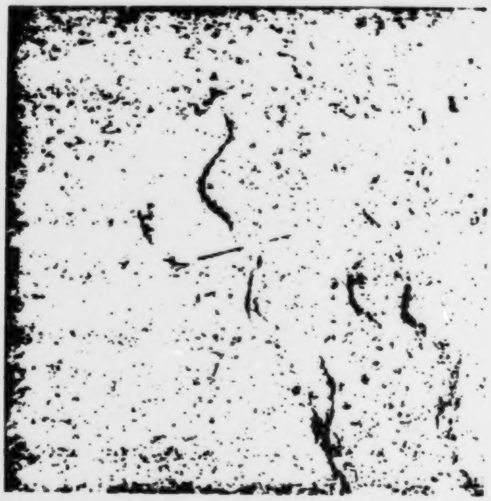
Other Features: Sheeting

Possible Uses: Curbing stone, possibly architectural stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a brown, medium grained, massive syenite. Vertical jointing is of a limited to moderate intensity and occurs in regular sets. The horizontal jointing is more closely spaced. Despite the fact that outcrop exposure is good, access to the area is limited which further diminishes its appeal to the building stone industry.

General appearance of outcrop. Note joint free areas along with average 1 m thick sheeting in the background.
86-GRI-004



Close-up of massive texture, medium-grained size, and grey-brown colour.
86-GRI-004

BUILDING STONE INVENTORY

Property No. 86-GRI-005 **Pluton Name** Mt. Moriah Syenite

Property Name Genereaux Hunt Camp 82 **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Grimsthorpe **Lot** 21 **Con.** 1

NTS 31C/11 **UTM Co-ordinates: Easting** 308900 **Northing** 4952500

Property Status Prospect **Air Photo No.** 78-4445 157-228

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark mauve brown

Weathered Surface Grey-brown

Uniform X **Variable**

Weathering Depth: 1/2 cm

Grain Size: Coarse-medium **Uniform** X **Variable** (X)

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing X **Moderate Jointing** X **Intensive Jointing**

A) Strike 010 degrees **Dip** Shallow E **Spacing** 1-2 m

B) Strike 100 degrees **Dip** 90 degrees **Spacing** 1-2 m, up to

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Good

Mineralogy: Feldspar, amphibole, biotite; Mafic content: approx. 20%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

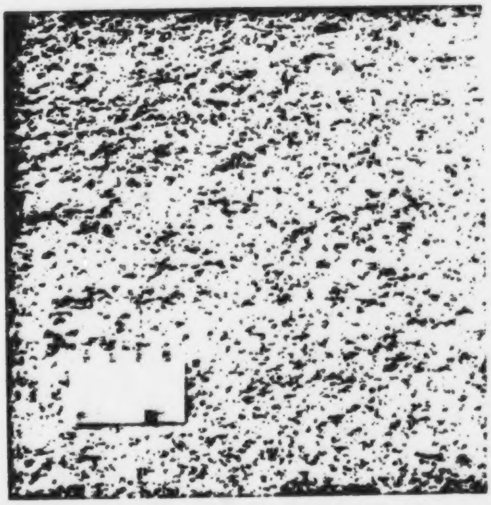
Other Features: 1 cm wide granitic stringer was observed

Possible Uses: Architectural stone, structural stone, curbing stone etc.

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: Some 10-30 square meter joint-free areas were observed. Jointing is generally regular in pattern, with 2 major vertical sets and a horizontal to sub-horizontal sheeting plane.

General appearance. Also note 1 m sheeting. 86-GRI-005



Textural close-up of grey-brown syenite. 86-GRI-005

MOUNTAIN GROVE MAFIC INTRUSION

LOCATION: SOUTHWESTERN OLDEN TOWNSHIP, NORTH OF LONG LAKE AND SOUTH OF BASS LAKE
NTS 31C/10 OGS MAP #2249
GEOLOGICAL REPORT #216

SAMPLE SITES: 86-OLD-027

DESCRIPTION OF AREA

Wolff (1982, p.30) describes the Mountain Grove mafic intrusion as follows:

"Compositionally, the body varies from gabbro and quartz gabbro to anorthosite, monzonite and syenite. Outcrops of these units tend to be small and massive with locally developed penetrative fractures. Individual outcrops may have more than one phase present. Igneous layering or banding, however, is absent and the different phases have irregular contacts. Locally, intrusive breccias between phases are observed."

The rock at site 86-OLD-027 is a massive, black gabbro which is attractive but contains deleterious features including intense, irregular fracturing, pyrite, and felsic stringers.

CONCLUSIONS

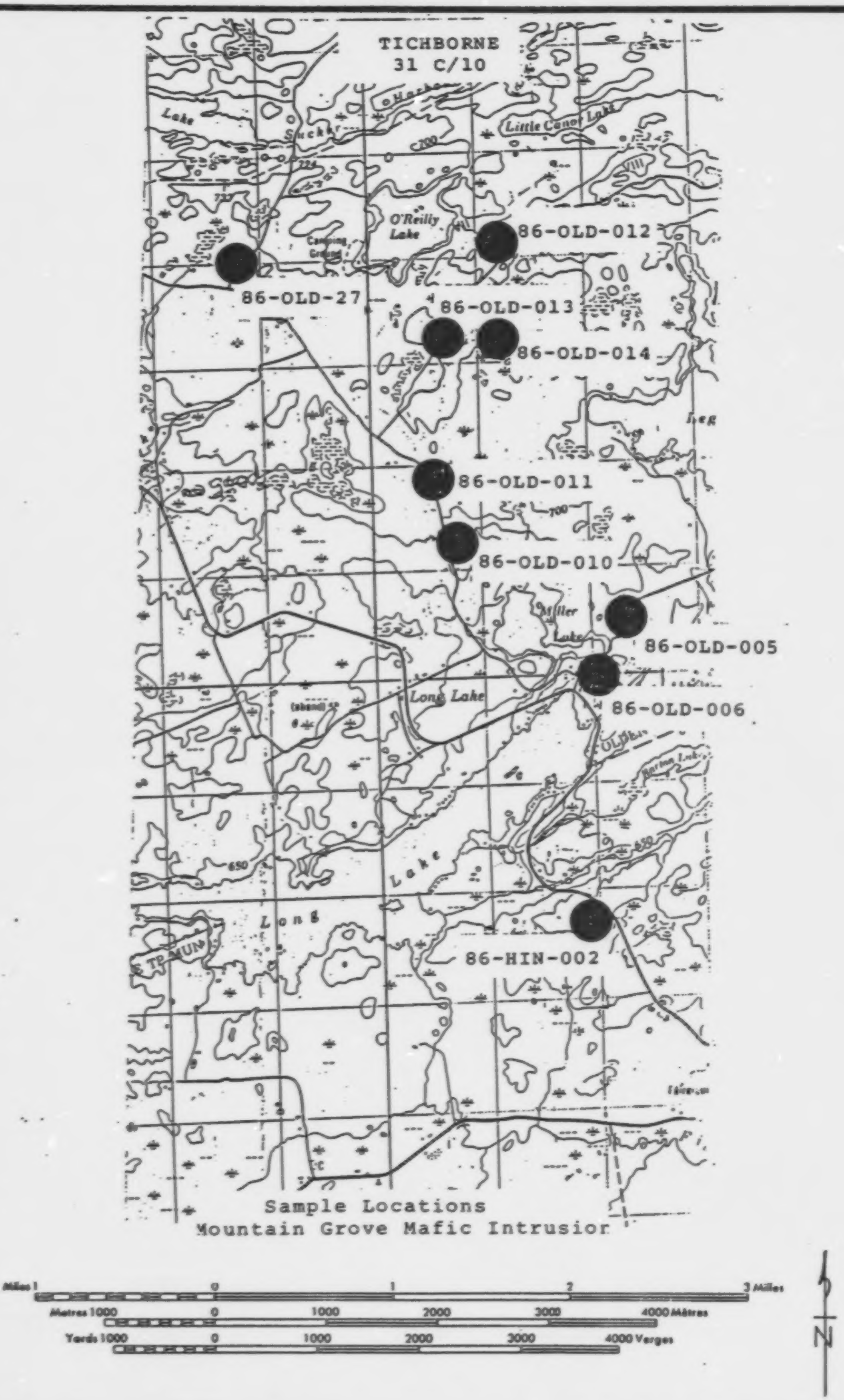
The Mountain Grove mafic intrusion has little potential as a source of building stone.

POTENTIAL

POOR	MODERATE	GOOD
86-OLD-027		

REFERENCES

Wolff, J.M.
1982: Geology of the Long Lake Area; Ontario Geological Survey, Report 216, 76p. Accompanied by Map 2449, scale 1:31 680 or 1 inch to 1/2 mile.


TICHBORNE
31 C/10
86-OLD-012
86-OLD-27
86-OLD-013
86-OLD-014
86-OLD-011
86-OLD-010
86-OLD-005
86-OLD-006
86-HIN-002
O'Reilly Lake
Little Canoe Lake
Miller Lake
Long Lake
Long Lake
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Mountain Grove Mafic Intrusion

BUILDING STONE INVENTORY

Property No. 86-OLD-027 **Pluton Name** Mountain Grove Mafic Intrusion

Property Name Brewers Road **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Olden **Lot** 10 **Con.** 6

NTS 31C/10 **UTM Co-ordinates: Easting** 358800 **Northing** 4954000

Property Status Roadcut **Air Photo No.** 78-4451-143-112

Production History Nil

Use of Explosives: Yes X **No** **Type** High velocity

Colour: Fresh Surface Almost black - very dark grey

Weathered Surface Light grey

Uniform X **Variable**

Weathering Depth: 5 mm

Grain Size: Medium to coarse **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 130 degrees **Dip** Vertical **Spacing** .25 - .5 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, pyroxene

Deleterious Minerals: Yes X **No** **Type** Pyrite **Percent** Trace

Other Features: Many felsic stringers were noted in the area

Possible Uses: Ornamental stone, ashlar, paving stone

Outcrop Exposure: Good **Fair** X **Poor**

Comments: The stone at this site is a dark grey to black gabbro and is quite attractive. The area shows fair outcropping with intense irregular jointing. The rock is uniformly massive and medium to coarse grained. Jointing, felsic stringers and trace amounts of pyrite combine to make this a poor prospect for building stone.

Gabbroic outcrop exhibiting vertical jointing and fair exposure.
86-OLD-027

NEWBORO PLUTON

LOCATION: NORTH CROSBY TWP., BETWEEN WESTPORT & NEWBORO
NTS 31C/9 OGS MAP #2054 GSC MAP 1182A
GSC MEMOIR #346

SAMPLE SITE: 86-NCROS-005

DESCRIPTION OF AREA

The Newboro Pluton has very limited exposure which made both sampling and evaluation difficult. Access across the centre of the pluton was possible by a hydro line. This was traversed but no outcrop was encountered.

The rock is an attractive red-brown syenite that has a uniform, colour, texture and grain size. The jointing is regular but the intensity is indeterminate.

Wynne-Edwards (1967, p.84) describes the Newboro Lake area as follows:

"The Newboro Lake area is a northeastward extension of the Devil Lake block, but the structures within it are less clearly defined. Layered genisses with associated fine-grained pink granulite are exposed on islands in Newboro Lake and trend east-northeast to northeast with northwestward dips. North of Scott Island, these rock abruptly swing northwestward towards the Devil Lake anticline and describe an arc about the monzonite body west of Newboro. Concomitantly, the direction of plunge of fold axes changes progressively from northeast in the western part of the area through north, to northwest near Newboro village. The amount of plunge remains roughly constant at about 55 degrees throughout the area, so that the fold axes trace out part of a cone with a vertical axis. The arcuate trend of these gneisses and the change in direction of the fold axes appear to be related to the late stages of deformation in the Rideau Lakes area."

CONCLUSIONS

Due to the highly limited outcrop exposure and the presence of sulphides (<1%), this pluton has a very low potential for building stone.

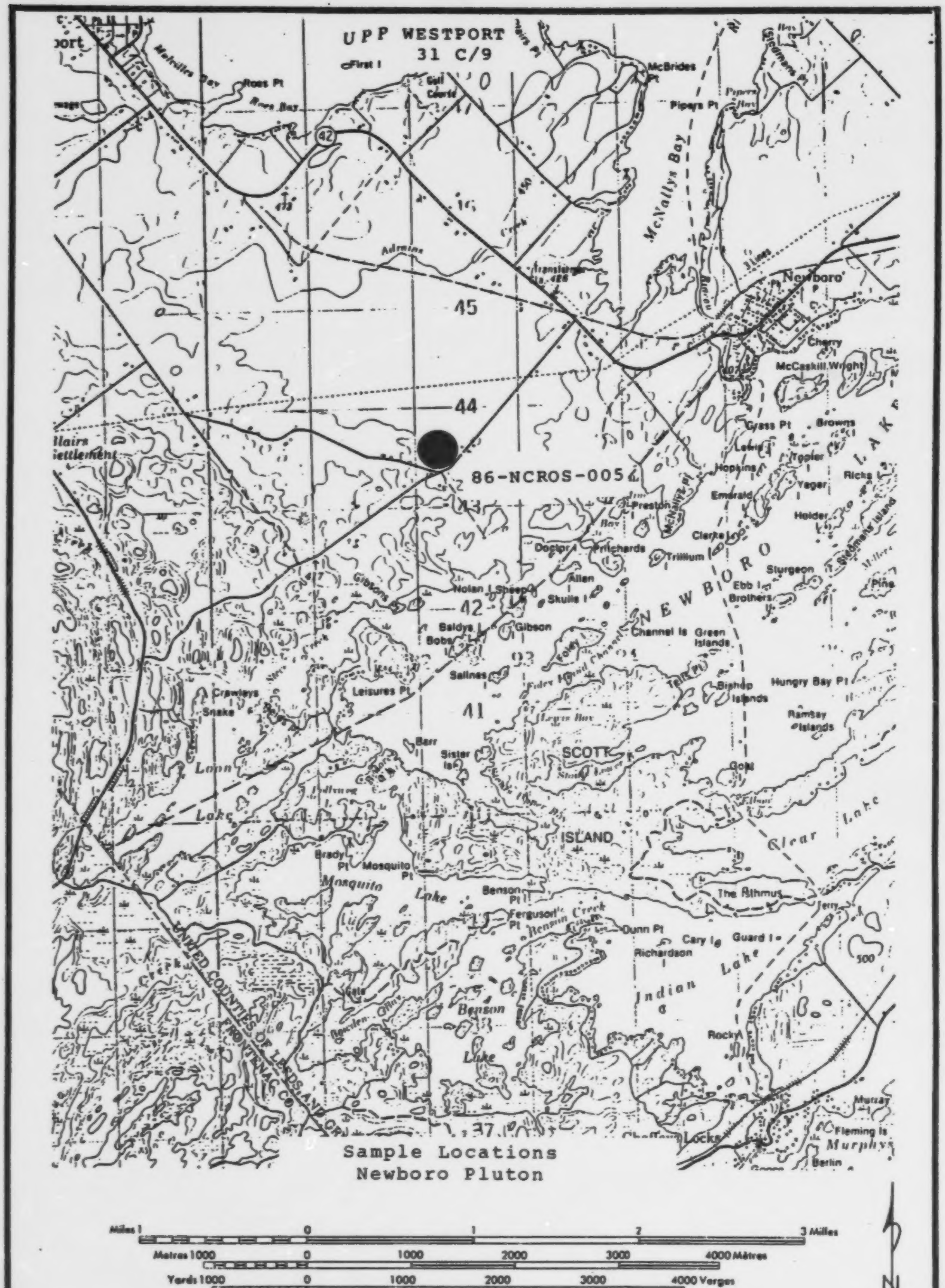
POTENTIAL

POOR	MODERATE	GOOD
86-NCROS-005		

REFERENCES

Hewitt, D.F.
1964: Geological Notes for Maps Numbers 2053 & 2054, Madoc-Gananoque Area, NTS 31B/5 + 12, 31C, Ontario; Ontario Department of Mines, Geological Circular 12.

Wynne-Edwards, H.R.
1967: Westport Map-Area, Ontario; Geological Survey of Canada, Memoir 346, 142p.


UPP WESTPORT
31 C/9
86-NCROS-005
Newboro
McNallys Bay
NEWBORO LAKE
SCOTT ISLAND
Mosquito Lake
Loon Lake
Clear Lake
Indian Lake
Benson Lake
UNITED COUNTIES OF LEEDS AND GR
FRONTENAC CO
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Newboro Pluton

BUILDING STONE INVENTORY

Property No. 86-NCROS-005 **Pluton Name** Newboro Pluton

Property Name Blairs Settlement **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township North Crosby **Lot** 3 **Con.** 7

NTS 31C/9 **UTM Co-ordinates: Easting** 392050 **Northing** 4943450

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes X **No** **Type** Roadcut

Colour: Fresh Surface Reddish brown

Weathered Surface Bleached pink to dark grey

Uniform X **Variable**

Weathering Depth: 0.5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X (blasting)

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) **Strike** 030 degrees **Dip** vertical **Spacing** (blasting)

B) **Strike** 110 degrees **Dip** vertical **Spacing**

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, pyroxene (amphibole); Mafic content: approx. 20-30%

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

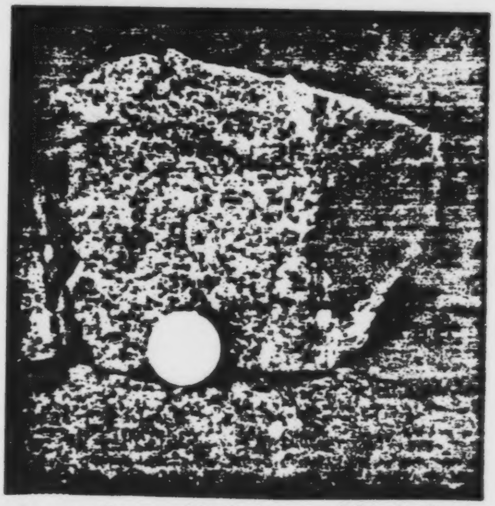
Other Features: Small volume, cut by a silica dyke, rare mafic stringers 2 mm)

Possible Uses: Terrazzo chips, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This is a very attractive, reddish brown syenite which is very competent and has few flaws. However, the site is adjacent to a large quartz dike and a zone of pegmatitic material, and the rock locally contains mafic stringers. Outcrop exposure is poor and blasting has obscured the joint pattern.

Overall view of outcrop showing extensive jointing due to blasting. 86-NCROS-005



Fresh surface dipicts reddish-brown colour and lack of deleterious minerals. 86-NCROS-005

NORTHBROOK BATHOLITH

LOCATION: North-east 1/4 of Kaladar township and the northern 1/2 of Kennebec township
NTS 31C/11 OGS MAP #51D, 2432
GEOLOGICAL REPORT #215, AR 51, PT. 4

SAMPLE SITES: 86-KAL-006, 86-KEN-001, 86-KEN-002, 86-KEN-003, 86-KEN-004, 86-KEN-005, 86-KEN-006

DESCRIPTION OF AREA

Wolff (1982b, p.44) described this batholith as follows:

> "This body is structurally very massive, weakly lineated with a locally developed discontinuous gneissosity. The batholith contains many northeast- and east-trending lineaments which truncate and cut one another. Faults with obvious offsets tend to have southeasterly trends. Some southeast trending pink-white pegmatite dikes cut the batholith along its southern margin."

Rock types observed within the Northbrook Batholith consist of monzonites, specifically quartz monzonites and biotite quartz monzonites. All of these are moderately to strongly foliated (due to alignment of biotite crystals).

The northern-most samples appear to be less foliated than the southern sites (KEN-001; 002; 003; 004). The average strike of the foliation is 50 degrees and the dip is variable to the south. One site, in Kaladar township, has a dip of 70 degrees to the west.

The colour of all of the sites in Kennebec township is generally uniform pink to light pink. The Kaladar site (86-KAL-006) has a brown/black fresh surface which is also uniform.

Jointing is one of the major limiting factors at all of these sites. All sites show irregular and regular jointing and all but one (86-KEN-001) is jointed intensely. Horizontal sheeting is also evident and rarely reaches spacings of over 1 m, averaging approximately 0.5 m.

Other features which hamper the potential for building stone include pegmatite dikes, many quartz stringers, aplite pods and exfoliation. Some sites have areas where large sized blocks could be removed without jointing problems. These same areas were invariably plagued with the shortcomings listed above.

CONCLUSION

The Northbrook Batholith has little potential for large quarry blocks. In areas such as 86-KEN-001 it would be feasible for rock to be removed for ashlar, paving stone or crushed stone, if a nearby market for such could be found.

POTENTIAL

POOR		MODERATE	GOOD
86-KAL-006	86-KEN-002	86-KEN-001	

86-KEN-003
86-KEN-004

86-KEN-005
86-KEN-006

REFERENCES

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Harding, W.D.
1944: Geology of Kaladar and Kennebec Townships, Lennox and Addington, and Frontenac Counties, Ontario; Ontario Department of Mines, Annual Report 1942, Volume 51, Part 4, p.51-74.

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1970: Geology-Kingston Area; Department of Geology, Carleton University, 1968-70.

Meen, V.B.
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Moore, J.M., and Thompson, P.H.
1972: The Flinton Group, Grenville Province, Eastern Ontario; Proceedings of the 24th International Geological Congress, Montreal, p.221-229.

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Wolff, J.M.
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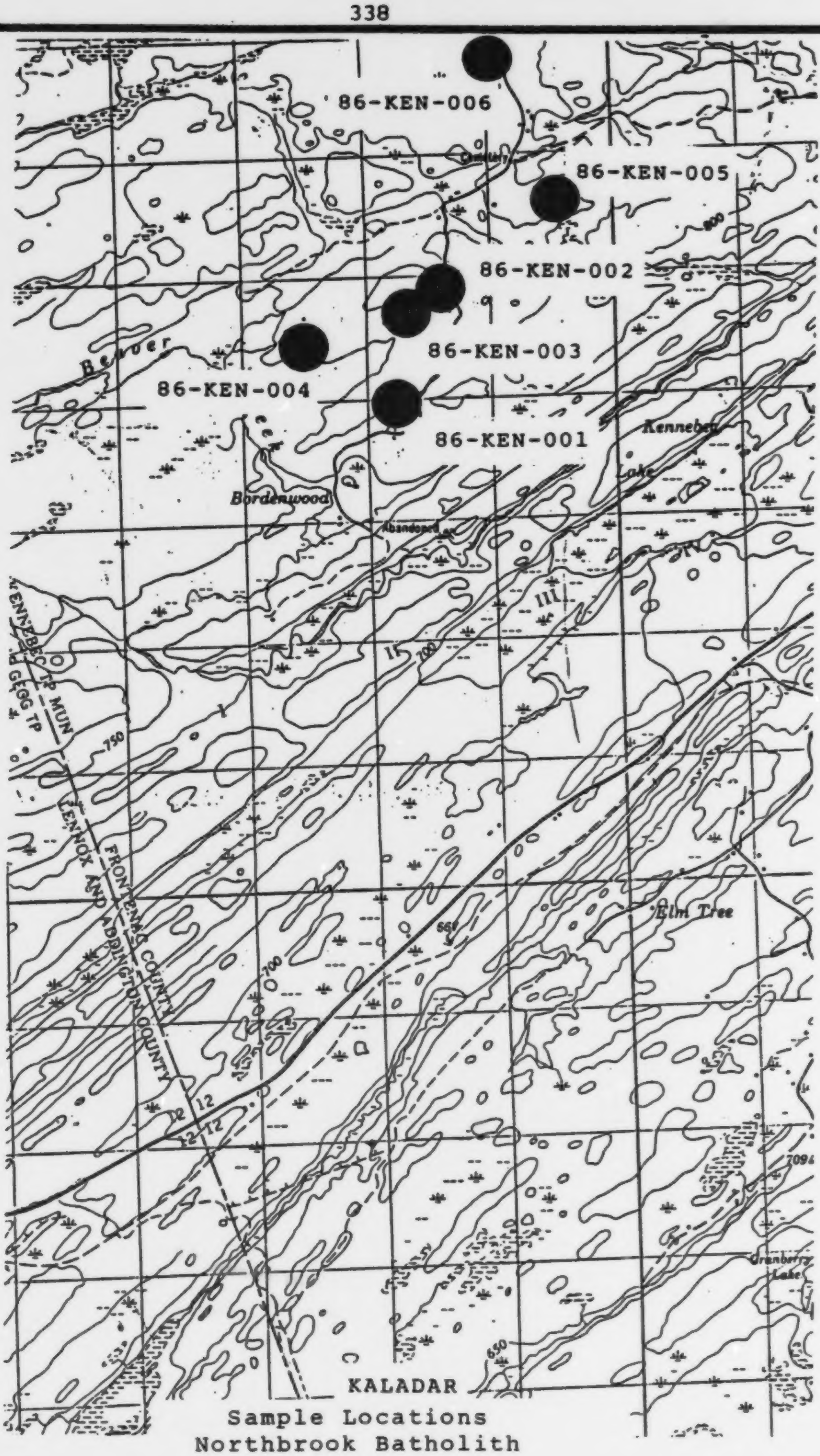
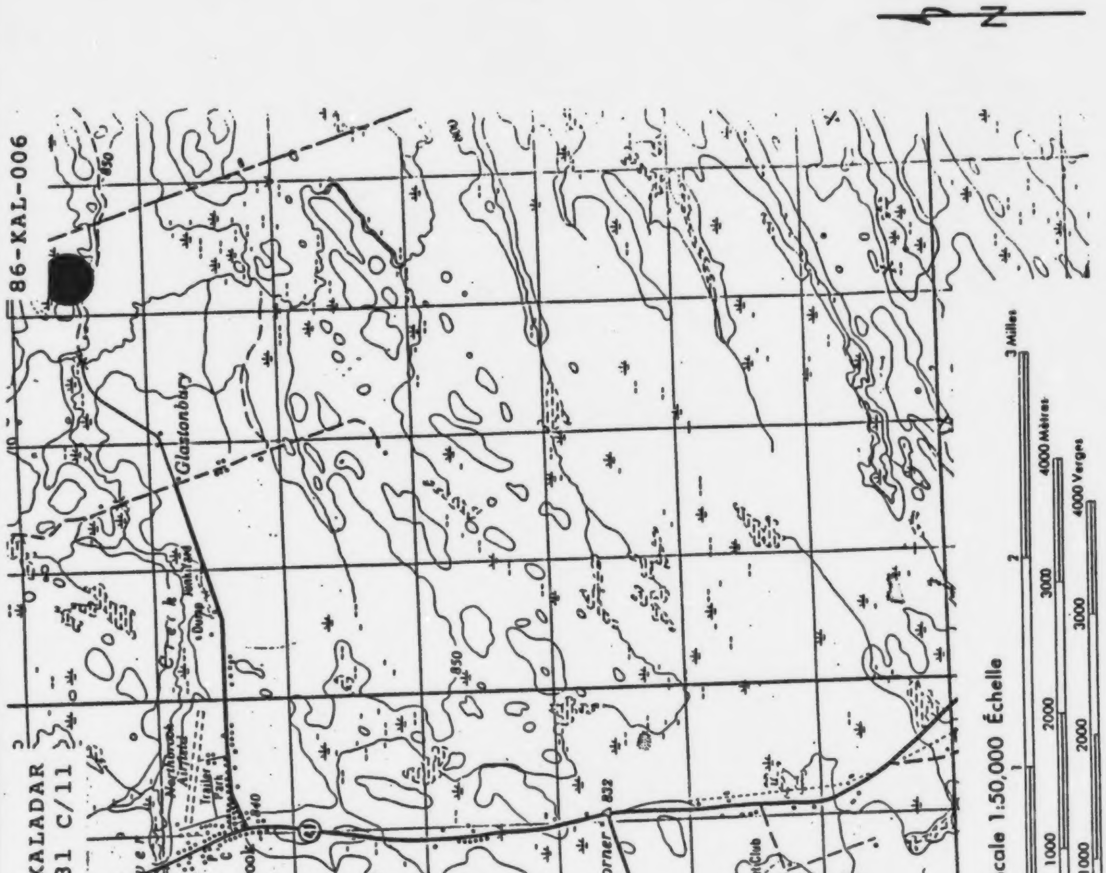
1978: Long Lake Area, Frontenac County; in Summary of Field Work, 1978, Ontario Geological Survey, Miscellaneous Paper 82, p.119-212.

1982a: Geology of the Long Lake Area; Ontario Geological Survey, Report 216, 76p. Accompanied by Map 2449, scale 1:31 680 or 1 inch to 1/2 mile.

1982b: Geology of the Kaladar Area, Frontenac, and Lennox and Addington Counties; Ontario Geological Survey, Report 215, 94p. Accompanied by Map 2432, scale 1:31 680.


86-KEN-006
86-KEN-005
86-KEN-002
86-KEN-003
86-KEN-004
86-KEN-001
Beaver
Cemetery
800
Kennebec
Lake
Bordenwood
Abandoned
KENNEBEC TP MUN
GEGG TP
750
700
Elm Tree
FRONTENAC COUNTY
LENNOX AND ADDINGTON COUNTY
12
650
Cranberry Lake
KALADAR
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Northbrook Batholith
(sheet 1)


N
86-KAL-006
KALADAR
31 C/11
Glastonbury
Beaver Creek
Northbrook
Northbrook Airfield
Trailer Park
Flinton Corner
Flinton
Skeet Club
Cemetery
Transformer Station
57
55
54
53
52
51
50
850
900
Scale 1:50,000 Échelle
Miles
Mètres
Yards
Verges

Sample Locations
Northbrook Batholith
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-KAL-006 **Pluton Name** Northbrook Batholith

Property Name Northbrooke 54 **Commercial Stone Name** Granite

Geological Rock Name Biotite quartz monzonite to biotite granite

Township Kaladar **Lot** 26 **Con.** 11

NTS 31C/11 **UTM Co-ordinates: Easting** 333300 **Northing** 4956600

Property Status Prospect **Air Photo No.** 78-4452-157-54

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Brown/Black

Weathered Surface Dull Grey

Uniform X **Variable**

Weathering Depth: 1-2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** **Mod.** **Strong** X **Strike** 50 degrees **Dip** 70 degrees west

Formed By Alignment of biotite

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike Horizontal **Dip** **Spacing** .5 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Pegmatite dike 1 m wide striking at 160 degrees, some quartz veins.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair Poor X

Comments: This rock is a medium grained, strongly foliated, brownish coloured granitic rock. Intense irregular jointing, quartz veins and pegmatite dikes are present at this location.

View of outcrop depicting a number of 1 m benches.
86-KAL-006

View of outcrop showing vertical and horizontal jointing.
86-KAL-006

BUILDING STONE INVENTORY

Property No. 86-KEN-001

Property Name Skink Hill

Pluton Name Northbrook Batholith

Commercial Stone Name Granite

Geological Rock Name Quartz monzonite

Township Kennebec **Lot** 20 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 338200 **Northing** 4953900

Property Status Prospect **Air Photo No.** 78-4451 143-89

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink to black and pink

Weathered Surface Pink with grey

Uniform **Variable** X

Weathering Depth: 2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** **Strike** 60% **Dip** ?

Formed By Gneissic banding

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike	horizontal	**Dip**		**Spacing**	1 m
B) Strike	140 degrees	**Dip**	90 degrees	**Spacing**	1-4 m varying
C) Strike	55 degrees	**Dip**	90 degrees	**Spacing**	5 m
D) Strike		**Dip**		**Spacing**	

Potential For Quarry Blocks: Fair

Mineralogy: Feldspar, quartz, biotite

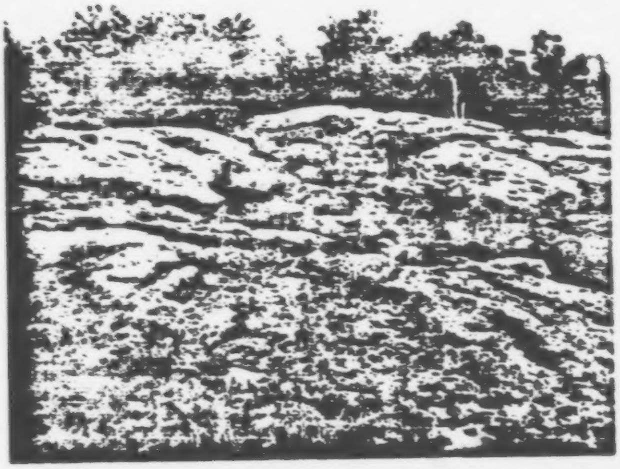
Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz veins 2 cm thick dipping at 16 degrees East striking at 75 degrees - aplite pods, pegmatitic veining.

Possible Uses: Small quarry blocks for monumental stone, curbing, landscaping, crushed stone, ashlar.

Outcrop Exposure: Good X Fair Poor

Comments: This rock is a medium grained, pink to pink and black gneissic quartz monzonite. The outcrop exposure at this site is extensive and jointing is limited in local areas. There are some pegmatitic and aplite pods. Horizontal sheeting varies in thickness from .3 to 1 m. This area shows some potential for quarry block extraction.



This quartz-monzonite exhibits good outcrop exposure. 86-KEN-001

Moderate jointing was noted on this outcrop. 86-KEN-001

BUILDING STONE INVENTORY

Property No. 86-KEN-002 **Pluton Name** Northbrook Batholith

Property Name Bordenwood Road **Commercial Stone Name** Granite

Geological Rock Name Quartz monzonite

Township Kennebec **Lot** 21 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 338600 **Northing** 4954800

Property Status Prospect **Air Photo No.** 78-4451-143-89

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pinkish red

Weathered Surface Pink with grey

Uniform **Variable** X

Weathering Depth: 4 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** **Mod.** **Strong** X **Strike** 60 degrees **Dip** ?

Formed By Gneissic layering

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X to **Intensive Jointing** X

A) Strike 140 degrees **Dip** ? **Spacing** .5-6 m avg. 1 m

B) Strike 30 degrees **Dip** ? **Spacing** 3 m

C) Strike horizontal **Dip** 0 degrees **Spacing** .5 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair to poor

Mineralogy: Feldspar, quartz, biotite

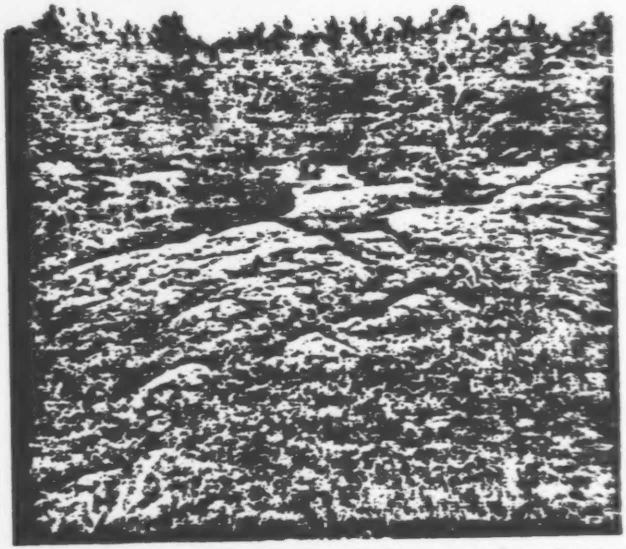
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: .5 m sheeting, granitic stringers and pegmatite dykes (1/2 m)

Possible Uses: Ashlar, crushed stone, landscaping stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a medium grained, pinkish red gneissic quartz monzonite. The colour varies slightly throughout the outcrop. Joint intensity and horizontal sheeting will restrict potential quarry block sizes. The strong foliation (gneissosity) of this rock may make it particularly suitable for split stone applications.



Quartz-monzonite exhibiting good outcrop exposure along with moderate to intensive jointing. 86-KEN-002

BUILDING STONE INVENTORY

Property No. 86-KEN-003 **Pluton Name** Northbrook Batholith

Property Name Dean Creek **Commercial Stone Name** Granite

Geological Rock Name Quartz Monzonite

Township Kennebec **Lot** 21 **Con.** 3

NTS 31C/11 **UTM Co-ordinates: Easting** 338400 **Northing** 4954700

Property Status Prospect **Air Photo No.** 78-4451-143-89

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Light pink

Weathered Surface Pinkish

Uniform X **Variable**

Weathering Depth: .5 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 40 degrees **Dip**

Formed By Gneissic layering

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X to **Intensive Jointing** X

A) **Strike** 140 degrees **Dip** vertical **Spacing** 1-10 m

B) **Strike** 30 degrees **Dip** vertical **Spacing** 2-3 m

C) **Strike** 60 degrees **Dip** 65 degrees E **Spacing** .5 m

D) **Strike** 185 degrees **Dip** vertical **Spacing** .5-1 m

E) **Strike** horizontal **Dip** 0 degrees **Spacing** .5 to 1.5 m

Potential For Quarry Blocks: Poor to fair

Mineralogy: Feldspar, quartz, biotite

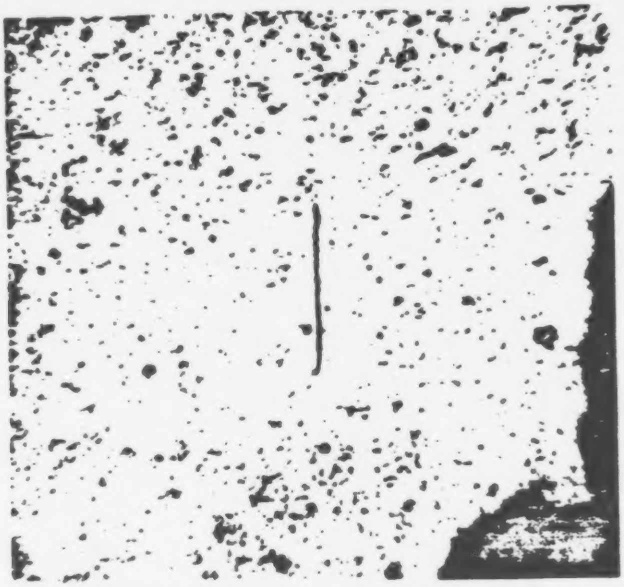
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz pods and veins (1-10 cm wide), stringers, pegmatite dykes (up to 1 m) moderate exfoliation.

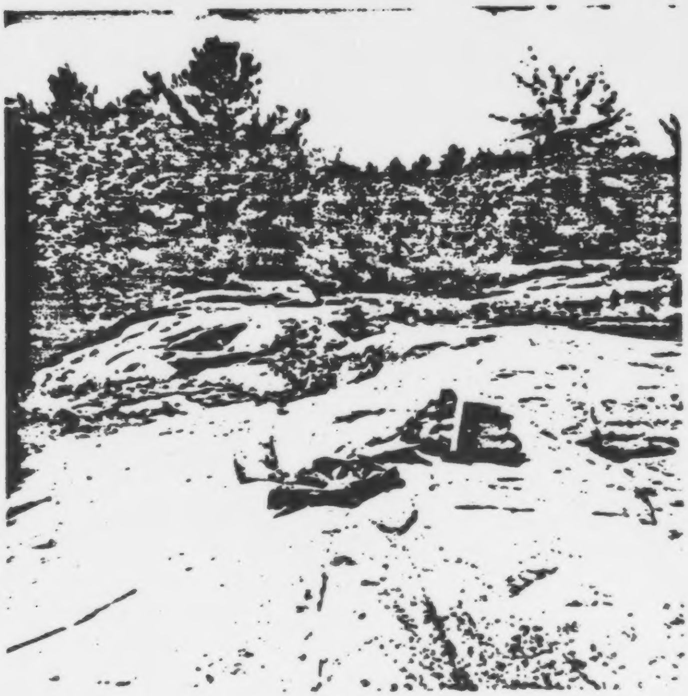
Possible Uses: Ashlar, crushed stone, small quarry blocks

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This is a medium grained, light pink, gneissic quartz monzonite. Many quartz stringers and pods, ranging from 1 to 10 cm wide are present in this outcrop. Pegmatitic and aplitic pods are also present. Both regular and irregular, moderate to intense joint patterns are apparent. Horizontal joint spacing ranges from about 0.5 m to 1.5 m.



Textural close-up of fresh surface of outcrop. 86-KEN-003



Both photographs exhibit good outcrop exposure along with moderate to intense jointing. 86-KEN-003

BUILDING STONE INVENTORY

Property No. 86-KEN-004 **Pluton Name** Northbrook Batholith

Property Name Beaver Creek **Commercial Stone Name** Granite

Geological Rock Name Quartz monzonite

Township Kennebec **Lot** 21 **Con.** 2

NTS 31C/11 **UTM Co-ordinates: Easting** 337500 **Northing** 4954400

Property Status Prospect **Air Photo No.** 78-4451-143-86

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Greyish-pink

Uniform X **Variable**

Weathering Depth: .2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod. Strong** X **Strike** 55 degrees
Dip 25 degrees S

Formed By Gneissic layering

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) **Strike** 140 degrees **Dip** Vertical **Spacing** .7-2 m

B) **Strike** 180 degrees **Dip** Vertical **Spacing** up to 3 m

C) **Strike** horizontal **Dip** 0 degrees **Spacing** .2 to 1.5 m

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Fair to poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz stringers and veins, some pegmatitic and aplite pods, severe degree of exfoliation.

Possible Uses: Ashlar, crushed stone, landscaping stone, small quarry blocks.

Outcrop Exposure: Good X Fair Poor

Comments: This rock is a medium grained, pink, gneissic quartz monzonite. The texture is fairly uniform over the area, with only a small degree of variability. The rock contains a large number of quartz stringers, usually 1 to 5 cm in width. Much of the outcrop area shows extensive exfoliation. The jointing is moderate to intense. Some small quarry blocks may be extractable.

Good outcrop exposure exhibiting exfoliation. 86-KEN-004

BUILDING STONE INVENTORY

Property No. 86-KEN-005 **Pluton Name** Northbrook Batholith

Property Name Bordenwood Cemetery **Commercial Stone Name** Granite

Geological Rock Name Biotite Quartz Monzonite

Township Kennebec **Lot** 22 **Con.** 4

NTS 31C/11 **UTM Co-ordinates: Easting** 339550 **Northing** 4955600

Property Status Prospect **Air Photo No.** 78-4452-157-54

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink-Grey

Uniform X **Variable**

Weathering Depth: <1 cm

Grain Size: Medium to fine **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** 45 degrees **Dip** 5 degrees

S

Formed By Gneissic banding

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 140 degrees **Dip** vertical **Spacing** .5 to 2 m

B) **Strike** 20 degrees **Dip** vertical **Spacing** .7 to 3 m

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veins (1-4 cm wide); aplite pods, granitic stringers,

Possible Uses: Ashlar, crushed stone.

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a gneissic, pink quartz monzonite with a medium to fine grain size. Jointing is intensive in both regular and irregular patterns. There are numerous granitic stringers, quartz veins, and aplitic pods present at this location.

Overall view of biotite quartz monzonite exhibiting good outcrop exposure along with a moderate amount of jointing. 86-KEN-005

BUILDING STONE INVENTORY

Property No. 86-KEN-006 **Pluton Name** Northbrook Batholith

Property Name Henderson Road **Commercial Stone Name** Granite

Geological Rock Name Biotite Quartz Monzonite

Township Kennebec **Lot** 23 **Con.** 4

NTS 31C/11 **UTM Co-ordinates: Easting** 339000 **Northing** 4956800

Property Status Prospect **Air Photo No.** 78-4452-157-60

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Greyish with pink spots

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: .2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** 60 degrees **Dip** ?

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 065 degrees **Dip** **Spacing** .2-1 m

B) **Strike** 140 degrees **Dip** **Spacing** .3-1 m

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Pegmatite dykes (up to 2 m wide), small granitic stringers

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a medium grained, moderately foliated, grey biotite-quartz monzonite. Pegmatite dikes, aplite dikes and pods, and quartz stringers are present. There is intense jointing. Horizontal sheeting is wide spread and closely spaced.

Overall view of outcrop showing intense jointing. Handle of hammer rests on 2 m wide pegmatite dike. 86-KEN-006

View showing horizontal sheeting. 86-KEN-006

RIDEAU LAKE PLUTON

LOCATION: NORTH SHORE OF RIDEAU LAKE, MOSTLY WITHIN NORTH BURGESS TOWNSHIP
NTS 31C/9 OGS MAP #2054 & GSC MAP #1182A
GEOLOGICAL REPORT #: GSC MEMOIR 346

SAMPLE SITES: 86-NBURG-001, 86-NBURG-002, 86-NBURG-003, 86-NBURG-004, 86-NBURG-005

DESCRIPTION OF AREA:

The Rideau Lake Pluton is located on the north shore of Rideau Lake and is situated east of the Westport and Wolf Lake Plutons.

The rock found in the area is pinkish brown and massive to slightly foliated with predominantly irregular and intense jointing. Major mineral constituents are K-spar, plagioclase, biotite and quartz. Many deleterious features were seen throughout the outcrops visited. These include pegmatite dykes, quartz veins and pods, aplite dykes, and mafic inclusions.

The best site seen in this intrusion is 86-NBURG-005. Outcrop exposure is poor. Jointing is locally moderate, but some areas display intense horizontal sheeting.

CONCLUSIONS

Based on the site examinations, the area appears to have low potential for building stone.

POTENTIAL

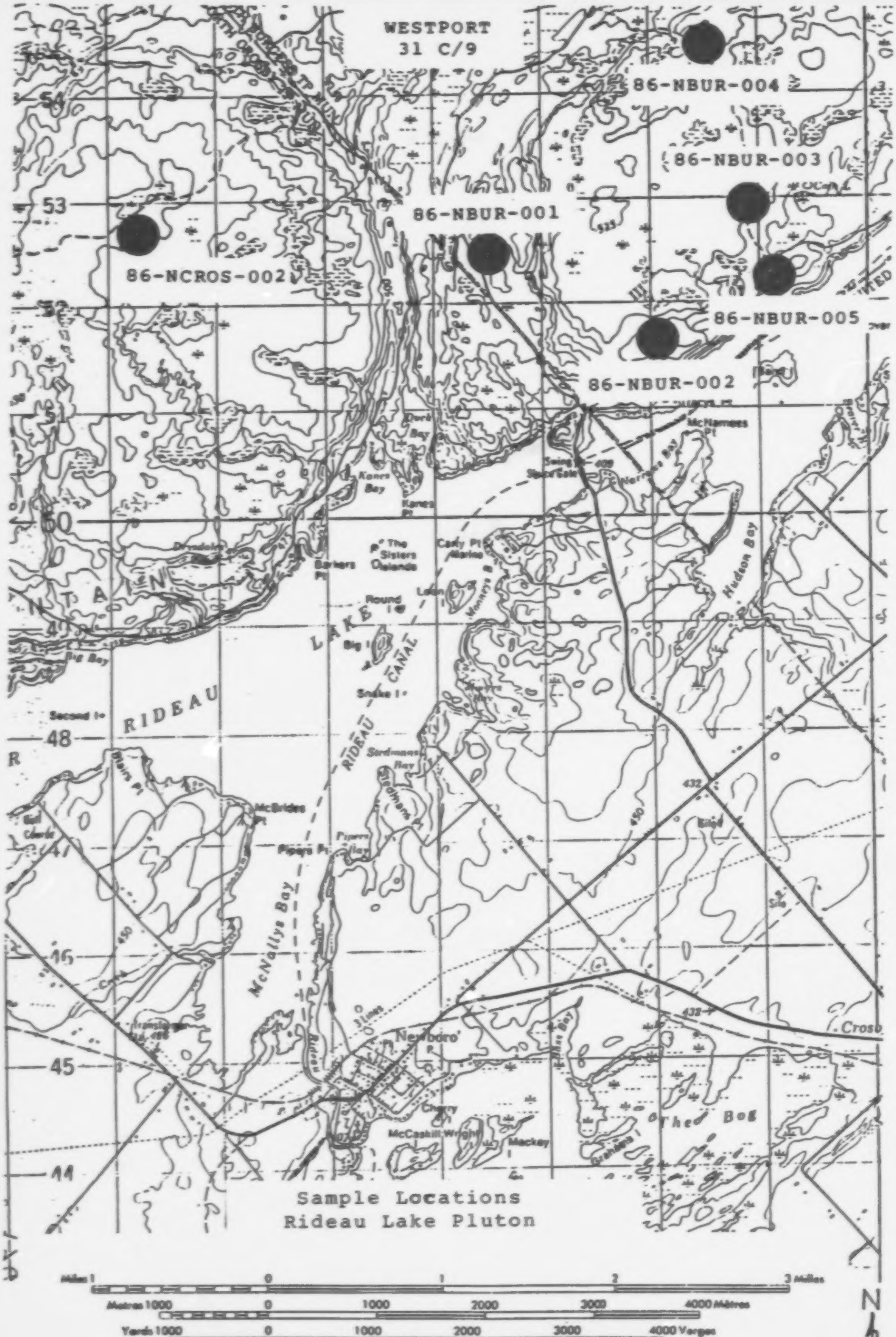
POOR	MODERATE	GOOD
86-NBURG-001		
86-NBURG-002		
86-NBURG-003		
86-NBURG-004		
86-NBURG-005		

REFERENCES

Davidson, A., Britton, J.M., Bell, K., and Blendinsop, J.
1979: Regional Synthesis of the Grenville Province of Ontario and Western Quebec; in Current Research, Part B, Geological Survey of Canada, Paper 79-1B, p.153-262.

Hewitt, D.F.
1964: Geological Notes for Maps Numbers 2053 & 2054, Madoc-Gananoque Area, NTS 31B/5 + 12, 31C, Ontario; Ontario Department of Mines, Geological Circular 12.

Wynne-Edwards, H.R.
1967: Westport Map-Area, Ontario; Geological Survey of Canada, Memoir 346.


WESTPORT
31 C/9
86-NBUR-004
86-NBUR-003
86-NBUR-001
86-NCROS-002
86-NBUR-005
86-NBUR-002
RIDEAU
LAKE
RIDEAU CANAL
Newboro'
Hudson Bay
McNallys Bay
The Bog
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Rideau Lake Pluton

BUILDING STONE INVENTORY

Property No. 86-NBUR-001 **Pluton Name** Rideau Lake Complex

Property Name The Narrows **Commercial Stone Name** Granite

Geological Rock Name Granite

Township North Burgess **Lot** 26 **Con.** 4

NTS 31C/9 **UTM Co-ordinates: Easting** 396500 **Northing** 4952450

Property Status Prospect **Air Photo No.** 78-4450-131-86

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Brownish-orange

Weathered Surface Grey to black

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** **Variable** X

Texture: Foliated **Uniform** **Variable**

Fabric: Yes **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Alignment of the biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite; **Mafic content:** approx. 30%

Deleterious Minerals: **Yes** **No X** **Type** **Percent**

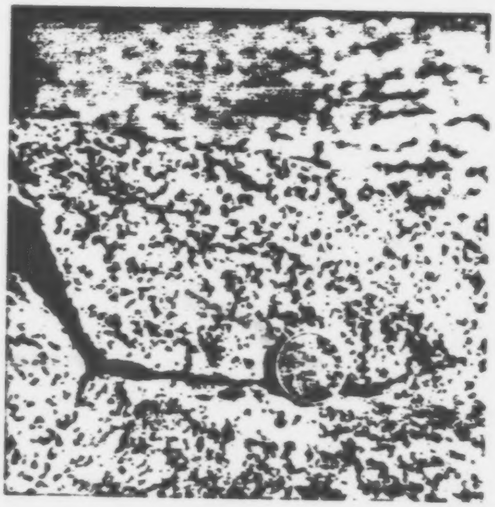
Other Features: Biotite content (20-30%), quartz veins, mafic inclusions, pegmatitic and aplite dikes, quartz pods

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair X** **Poor**

Comments: This is a brownish orange biotite-granite which is extensively weathered. Along the 100 m outcrop, aplite dikes, quartz veins, pegmatite, and mafic inclusions were observed. The high biotite content limits the potential of this rock for building stone development. The horizontal sheeting is less than 10 cm over much of this site.

Outcrop area showing intensive and irregular jointing. Outcrop exposure is fair. 86-NBUR-001



Hand specimen, depicting high mafic mafic content in fresh surface. 86-NBUR-001

BUILDING STONE INVENTORY

Property No. 86-NEUR-002

Property Name Tracy's Point

Pluton Name Rideau Lake Complex

Commercial Stone Name Granite

Geological Rock Name Syenite

Township North Burgess

Lot 25 **Con.** 3

NTS 31C/9 **UTM Co-ordinates: Easting** 398050 **Northing** 4951700

Property Status Prospect

Air Photo No. 78-4450-131-86

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Coarse **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes **No.** **Weak** X **Mod.** **Strong** **Strike** **Dip**

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 105 degrees **Dip** 90 degrees **Spacing** .2-1 m

B) Strike 40 degrees **Dip** 90 degrees **Spacing** .2-.5 m

C) Strike Horizontal **Dip** **Spacing** .1-.5 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite; **Mafic content:** approx. 25%

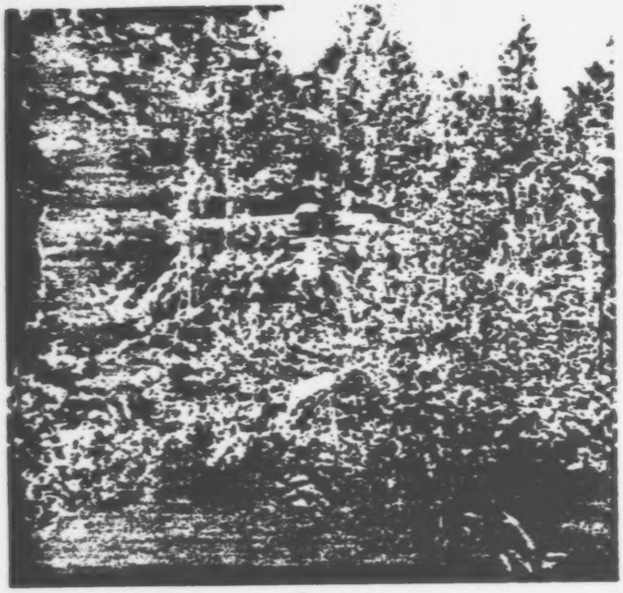
Deleterious Minerals: Yes No X Type **Percent**

Other Features: Rare quartz veining

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good Fair X Poor

Comments: This site contains low rounded ridges of pink, coarse syenite. The rock is weakly foliated. The coarse biotite crystals, which comprise approximately 25% of the rock, may tend to be plucked during cutting and polishing. A feature of this site which further diminishes its building stone potential is the intensive jointing.



Overall view of outcrop area.
86-NBUR-002

Fresh surface depicting coarse biotite.
86-NBUR-002

BUILDING STONE INVENTORY

Property No. 86-NBUR-003 **Pluton Name** Rideau Lake Complex

Property Name Coin Lake **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township North Burgess **Lot** 22 **Con.** 3

NTS 31C/9 **UTM Co-ordinates: Easting** 398900 **Northing** 4952930

Property Status Prospect **Air Photo No.** 78-4451-143&156

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Pink-grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike Horizontal **Dip** **Spacing** .1-.5 m

B) Strike 70 degrees **Dip** 90 degrees **Spacing** .1-.5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, amphibole, (quartz, sphene); Mafic content: approx. 10-15%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Intense horizontal sheeting (.1-.5 m spacing) surficial weathering

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a pink, massive, medium-grained syenite of the Rideau Lake Complex. Surficial weathering and the intense jointing (predominantly of an irregular nature) limit building stone potential.

BUILDING STONE INVENTORY

Property No. 86-NBUR-004
Pluton Name Rideau Lake Complex
Property Name Black Creek
Commercial Stone Name Granite
Geological Rock Name Syenite

Township North Burgess
Lot 21 **Con.** 4
NTS 31C/9 **UTM Co-ordinates: Easting** 398500 **Northing** 4954450
Property Status Prospect
Air Photo No. 78-4450-131-88
Production History Nil

Use of Explosives: Yes **No** X **Type**
Colour: Fresh Surface Red
Weathered Surface Pinkish red
Uniform X **Variable**
Weathering Depth:
Grain Size: Medium **Uniform** X **Variable**
Texture: Massive **Uniform** X **Variable**
Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**
Formed By
Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**
Jointing: Regular Pattern **Irregular Pattern** X
Limited Jointing **Moderate Jointing** **Intensive Jointing** X
A) Strike **Dip** **Spacing**
B) Strike **Dip** **Spacing**
C) Strike **Dip** **Spacing**
D) Strike **Dip** **Spacing**
Potential For Quarry Blocks: Poor
Mineralogy: Feldspar, biotite; Mafic content: approx. 30%

Deleterious Minerals: Yes X **No** **Type** Specularite **Percent** Trace

Other Features: Alteration of mafics

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good X **Fair** **Poor**

Comments: The outstanding feature of this medium grained, massive syenite is the deep red colour of the feldspars. Alteration of the mafic component and the intense irregular jointing found in this area limit the building stone potential. Nevertheless, owing to its deep red colour, this rock may have some use in the building stone industry.

BUILDING STONE INVENTORY

Property No. 86-NBUR-005 **Pluton Name** Rideau Lake Complex

Property Name SW of Sand Island **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township North Burgess **Lot** 23 **Con.** 3

NTS 31C/9 **UTM Co-ordinates: Easting** 399150 **Northing** 4952250

Property Status Prospect **Air Photo No.** 78-4450-135-88

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium **Uniform** **Variable** X

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X to **Intensive Jointing** X

A) Strike 108 degrees **Dip** 90 degrees **Spacing** .5 to 1.5 m

B) Strike 80 degrees **Dip** 90 degrees **Spacing** .5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite; Mafic content: approx. 20-25%

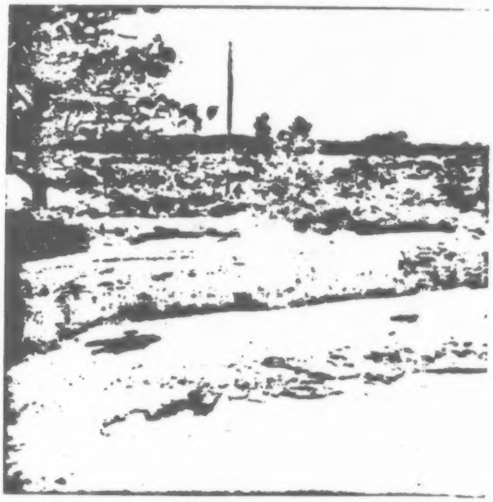
Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

Other Features: Quartz veins, aplite dikes, slight mafic alteration

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** **X**

Comments: This outcrop contains a medium grained, moderately foliated, pink syenite that is uniform in colour and texture. Jointing occurs in regular and irregular vertical sets, generally with moderate intensity. The presence of biotite crystals (approximately 20% of the rock, 2-5 mm in size) will limit this rock's ability to take a polish. Other deleterious features include quartz veins, aplite dikes and poor exposure.



View shows outcrop in a series of small ridges. Sheeting at this site is severe. 86-NBUR-005

SKOOTAMATTA LAKE AREA

LOCATION: CENTRAL ANGLESEA TOWNSHIP
NTS 31C/14 OGS 2053
GEOLOGICAL REPORT# AR 21, PT. 4

SAMPLE SITES: 86-ANG-001, 86-ANG-002, 86-ANG-003, 86-GRI-006, 86-GRI-007

DESCRIPTION OF AREA

The Skootamatta Lake area is composed of an area of pink granites and syenites, mafic intrusives and the extreme southern portion of the Weslemkoon Granite. The Weslemkoon Granite portion is located to the west of Skootamatta Lake in Grimsthorpe township.

Two samples were taken from the pink granites, 86-ANG-001, 86-ANG-002. Outcrop exposure in the area is very poor and good sites for evaluation are difficult to find. The rock found here is a massive, medium to coarse grained pink granite. Both regular and irregular jointing is common and tends to be very intensive. At 86-ANG-001 horizontal jointing was seen to be within a range of 0.1-0.5 metres. While the rock is fairly attractive, deleterious features such as the jointing and presence of aplite dykes appear to make this area one of low building stone potential.

The area of mafic intrusion is to the north, west and southeast of the lake. One sample was taken from this area, (86-ANG-003). This rock appears to be gabbroic anorthosite and is quite attractive, with a violet hue on the fresh surface. The rock is massive, medium to coarse grained and outcrop exposure is quite good.

Close examination of the rock revealed the presence of sulphides, probably pyrite.

Only one major joint set could be identified, striking about 140 with a vertical dip. Spacing of the joints is from 0.5-1.0 metres. The jointing, sulphide content, and fine stringers of quartz found throughout the area limit the potential for building stone.

Further to the west, two samples were taken in the extreme southern part of the Weslemkoon Granite. Both are massive, medium grained, grey granite with a salt and pepper appearance on the fresh surface.

Jointing in both areas is regular but fairly intensive with spacing up to about 1.5 metres and dipping vertically. Sulphides were noticed at 86-GRI-006 but not at 86-GRI-007. Quartz veining was noticed at both sites but 86-GRI-007 contained pegmatite dykes, aplite pods and some mafic inclusions. Because of the above mentioned features this area shows little potential for building stone.

POTENTIAL

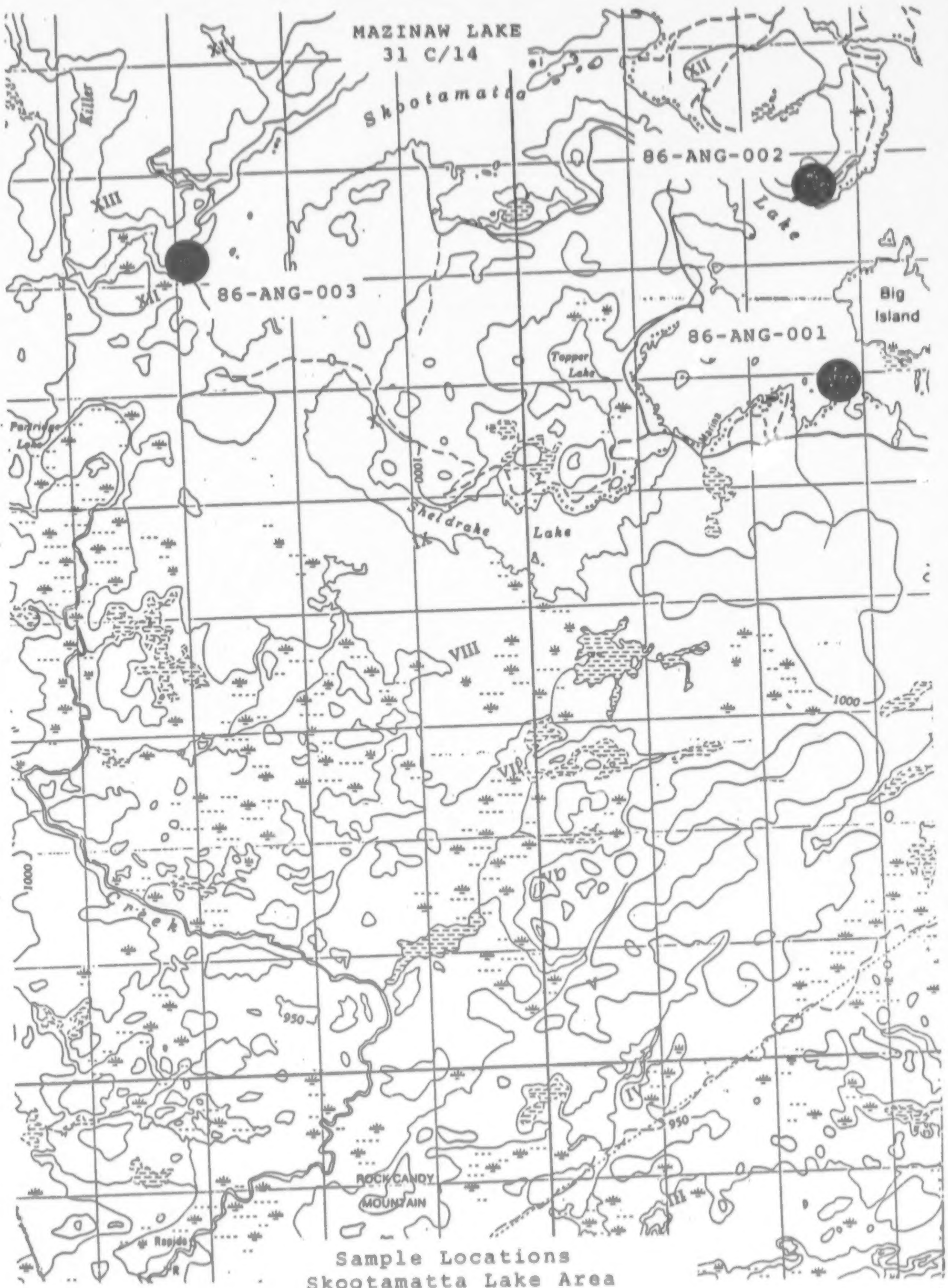
POOR	MODERATE	GOOD
86-ANG-001 86-ANG-002 86-ANG-003 86-GRI-006		

REFERENCES

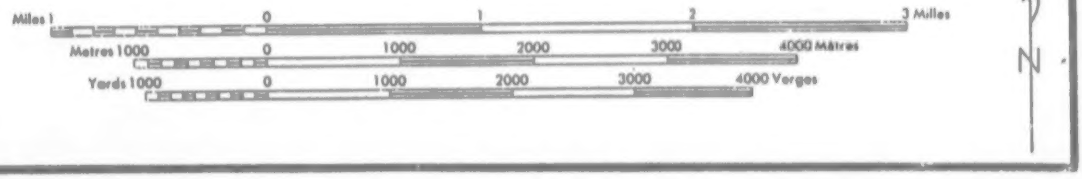
Davidson, A., Britton, J.M., Bell, K., and Blenkinsop, J.
1979: Regional Synthesis of the Grenville Province of Ontario and Western Quebec; in Current Research, Part B, Geological Survey of Canada, Paper 79-1B, p.153-262.

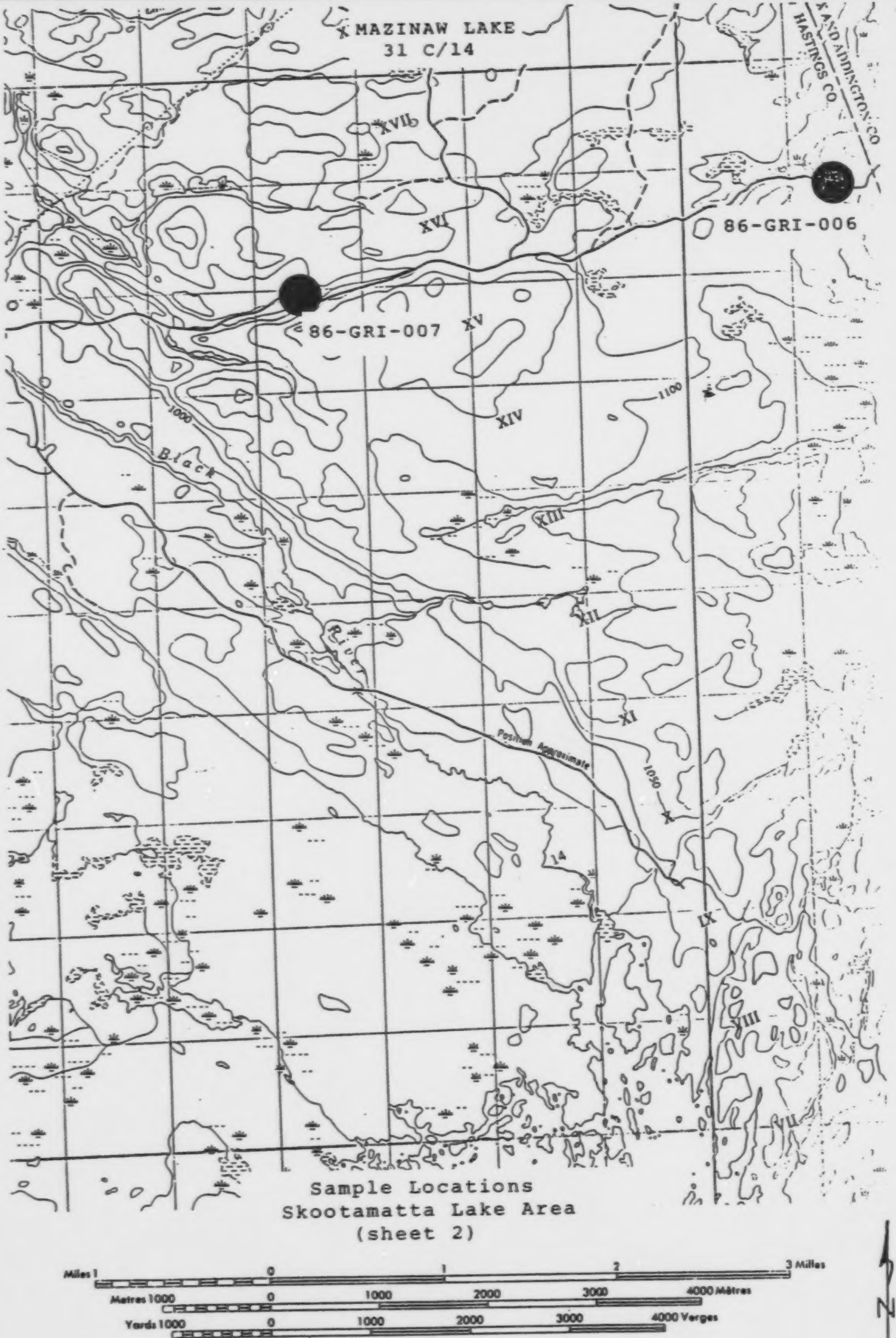
Meen, V.B.
1944: Geology of the Grimsthorpe-Barrie Area, Hastings, Lennox and Addington, and Frontenac Counties, Ontario; Ontario Department of Mines, Annual Report, 1942, Volume 51, Part 4, p.1-50.

Wahl, W.G.
1960: An Interpretive Technique for Delimiting Mineral Potential Areas Based on the Magnetic Susceptibility of Source Rocks; Proceedings of the 21st International Geological Congress, Part 2, p.200-215.


MAZINAW LAKE
31 C/14
Skootamatta Lake
86-ANG-002
86-ANG-003
86-ANG-001
Big Island
Topper Lake
Partridge Lake
Sheldrake Lake
Killer
Creek
Mazinaw
ROCK CANDY MOUNTAIN
Rapids
XIV
XIII
XII
XI
X
IX
VIII
VII
VI
IV
III
1000
950

Sample Locations
Skootamatta Lake Area
(sheet 1)


Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N


X MAZINAW LAKE
31 C/14
X AND ADDINGTON CO
HASTINGS CO.
XVIIb
XVI
86-GRI-006
86-GRI-007
XV
1100
XIV
1000
Black
River
XIII
XII
XI
Position Approximate
1050
X
14
IX
VIII
VII
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Skootamatta Lake Area
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-ANG-001 **Pluton Name** Skootamatta Lake Granite

Property Name Skootamatta Lake #1 **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Anglesea **Lot** 11 **Con.** 9

NTS 31C/14 **UTM Co-ordinates: Easting** 322800 **Northing** 4965900

Property Status Prospect **Air Photo No.** 78-4458-189-121

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink with black

Weathered Surface Pink-grey

Uniform X **Variable**

Weathering Depth: 1-2 cm

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X to

A) Strike Horizontal **Dip** **Spacing** .1-.5 m

B) Strike 150 degrees **Dip** Vertical **Spacing** 1.5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz; Mafic content: approx. 30%

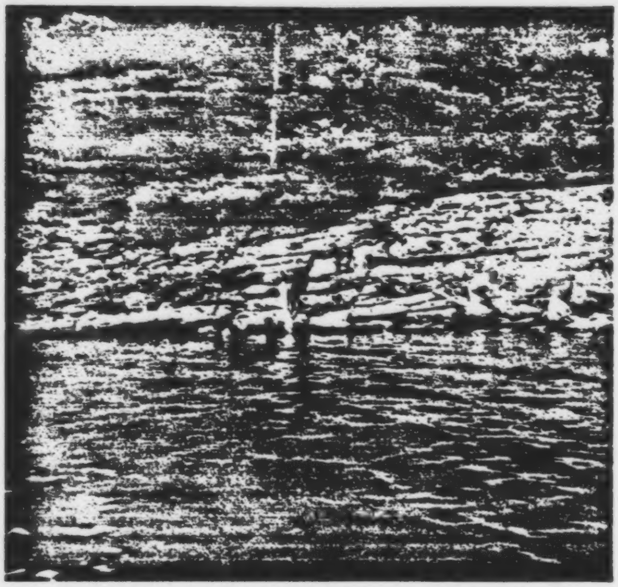
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Coarse biotite crystals (max. 5 mm dia.), exfoliation horizontal jointing (extensive), rare aplite dikes observed (2 cm wide)

Possible Uses: Ashlar, paving stone, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This sample is a massive, medium grained, pink granite which contains some coarse biotite crystals. Biotite comprises approximately 30% of the rock; this may reduce the ability of the rock to take a polish. Furthermore, outcrop exposure is poor and horizontal jointing is extensive. A regular vertical joint set strikes at 150 degrees and has a spacing of approximately 1.5 m. The presence of an aplite dike is another deleterious feature which limits building stone potential in this area.



Overall view depicting extensive horizontal jointing. 86-ANG-001

Close-up of pink-grey granite. 86-ANG-001

BUILDING STONE INVENTORY

Property No. 86-ANG-002 **Pluton Name** Skootamatta Lake Granite

Property Name Skootamatta 2 **Commercial Stone Name** Granite

Geological Rock Name Syenite

Township Anglesea **Lot** 10 **Con.** 11

NTS 31C/14 **UTM Co-ordinates: Easting** 322600 **Northing** 4967800

Property Status Prospect **Air Photo No.** 78-4459-190-72

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Red

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite

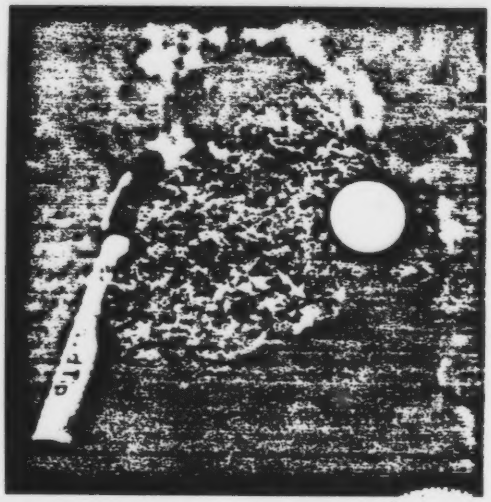
Deleterious Minerals: Yes No X Type Percent

Other Features: Aplite dike, major weathering - blocks falling off

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good Fair Poor X

Comments: This rock is a red massive syenite. The nature and intensity of jointing, inconsistent grain size, and poor outcrop exposure diminish the building stone potential of this area. Other deleterious features include aplite dikes and extensive weathering.



Close-up exhibiting red colour and massive texture of the syenite.
86-ANG-002

BUILDING STONE INVENTORY

Property No. 86-ANG-003 **Pluton Name** Skootamatta Lake Granite

Property Name Killer Creek **Commercial Stone Name** Granite

Geological Rock Name Gabbroic Anorthosite

Township Anglesea **Lot** 23 **Con.** 12

NTS 31C/14 **UTM Co-ordinates: Easting** 317100 **Northing** 4967200

Property Status Prospect **Air Photo No.** 78-4458-189-116

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Violet black

Weathered Surface Dark grey to black

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Medium to coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) **Strike** 140 degrees **Dip** near vertical **Spacing** .5-1 m

B) **Strike** **Dip** **Spacing**

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, amphibole; Mafic content: approx. 40%

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

Other Features: Stringers of quartz, amphibole alteration

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: The rock at this site is a medium to coarse-grained, violet-black, gabbroic anorthosite. The amphibole has been somewhat altered. The texture is massive and jointing is irregular and intense. Quartz stringers were also observed in this rock. These factors diminish the building stone potential of this area.

Overall view of outcrop area showing good outcrop exposure. 86-ANG-003

BUILDING STONE INVENTORY

Property No. 86-GRI-006 **Pluton Name** Weslemkoom Granite, Skootamatta Lake Area

Property Name Partridge Creek **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Grimsthorpe **Lot** 3 **Con.** 15

NTS 31C/14 **UTM Co-ordinates: Easting** 311400 **Northing** 4968750

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Salt and pepper

Weathered Surface Pinkish grey to black

Uniform X **Variable**

Weathering Depth: 1-2 m

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X to**Intensive Jointing** X

A) Strike 60 degrees **Dip** Vertical **Spacing** .5 m to 1.5 m

B) Strike 140 degrees **Dip** Vertical **Spacing** .1 m to 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite; Mafic Content: approx. 15-20%

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

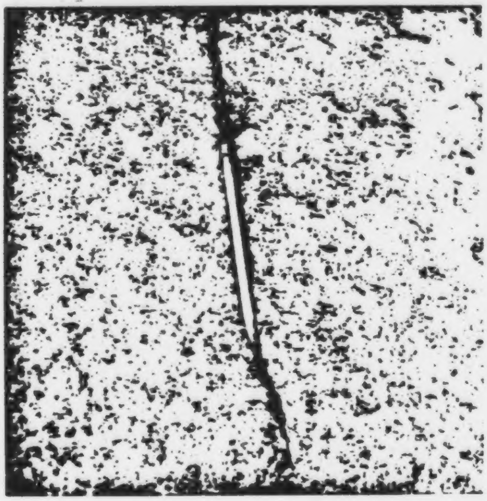
Other Features: Quartz veins, minor feldspar alteration

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This sample is a massive, medium grained granite which has a 'salt and pepper' appearance. Jointing is moderate to intensive and occurs in regular joint sets. Other deleterious features include the presence of quartz veins and sulphides. Outcrop exposure is very good.

Overall view of outcrop exhibiting moderate to intensive jointing.
86-GRI-006



Close-up of weathered surface.
86-GRI-006

BUILDING STONE INVENTORY

Property No. 86-GRI-007 **Pluton Name** Weslemkoom Granite, Skootamatta Lake Area

Property Name N.E. Black River **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Grimsthorpe **Lot** 14 **Con.** 16

NTS 31C/14 **UTM Co-ordinates: Easting** 306400 **Northing** 4967900

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Salt and pepper to pink salt and pepper

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth: 1-2 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 160 degrees **Dip** Vertical **Spacing** Up to 1 m

B) Strike 110 degrees **Dip** Vertical **Spacing** Up to 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite; **Mafic content:** approx. 20-25%

Deleterious Minerals: Yes No X Type Percent

Other Features: Pegmatite dike, quartz veining, aplite pods, mafic inclusions, rare feldspar megacrysts

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good X Fair Poor

Comments: This is a massive, medium grained granite. The colour of this rock varies from a 'salt and pepper' to a pink black and white colour across the outcrop. Rare feldspar megacrysts are present. Jointing is intense and regular. Other deleterious features observed include: aplite pods, pegmatite dikes, quartz veins and mafic inclusions.

Overall view of outcrop exhibiting extensive jointing and good outcrop exposure. 86-GRI-007

Close-up of quartz veining occurring in outcrop. 86-GRI-007

TAMWORTH, BELLROCK, WILKINSON, FIRST DEPOT MAFIC INTRUSIONS

LOCATION: CAMDEN EAST, PORTLAND, HINCHINBROOKE
NTS 31C/7, OGS MAP #2053
GEOLOGIC REPORT #

SAMPLE SITES: 86-CAM-001, 86-POR-001, 86-POR-002, 86-POR-003, 86-POR-004, 86-HIN-001

DESCRIPTION OF AREA

The rocks found in these mafic intrusions include diorite, gabbro, anorthosite, metagabbro, and amphibolite.

The first site visited was the Tamworth mafic intrusion just south of the town of Tamworth. The rock found here is a fine to medium grained, massive dark grey rock. The jointing in the area is irregular and intense thereby diminishing any building stone potential. Other features found in the area include quartz stringers and pods and black blotches of weathered material that occur commonly throughout the outcrop.

The second intrusion visited was the Bellrock mafic intrusion in Portland township. The rock found here was anorthositic in composition but not very fresh and also showed significant surface weathering. The jointing seen in the area was both regular and irregular and moderate in intensity with a one metre spacing, dipping vertically along a 120 strike. The grain size is medium to coarse, The texture is massive, and the rock appears fairly attractive. Some quartz veins and pyrite were seen throughout the outcrops. This area should be further investigated. 86-POR-003 seems to show the most potential.

The First Depot Lake mafic intrusion seems to show very little potential. Outcrop exposure is very poor and most outcrops exhibit intense, irregular jointing. The rock is a massive, medium grained gabbro. The area is surrounded by foliated felsic rocks.

The Wilkinson anorthosite intrusion in Hinchinbrooke township is a dark greyish-black, massive, coarse grained, porphyritic rock that is quite attractive. The jointing in the area is both regular and irregular and is generally quite intensive. This area is a very good example of an anorthosite and shows very large plagioclase crystals. One crystal measured 14 cm X 23 cm. The plagioclase crystals are not fresh and appear to be saussuritized. The area also displays some mafic xenoliths and moderately abundant granitic and quartz stringers. Due to the above factors, this area is deemed to have poor to moderate potential.

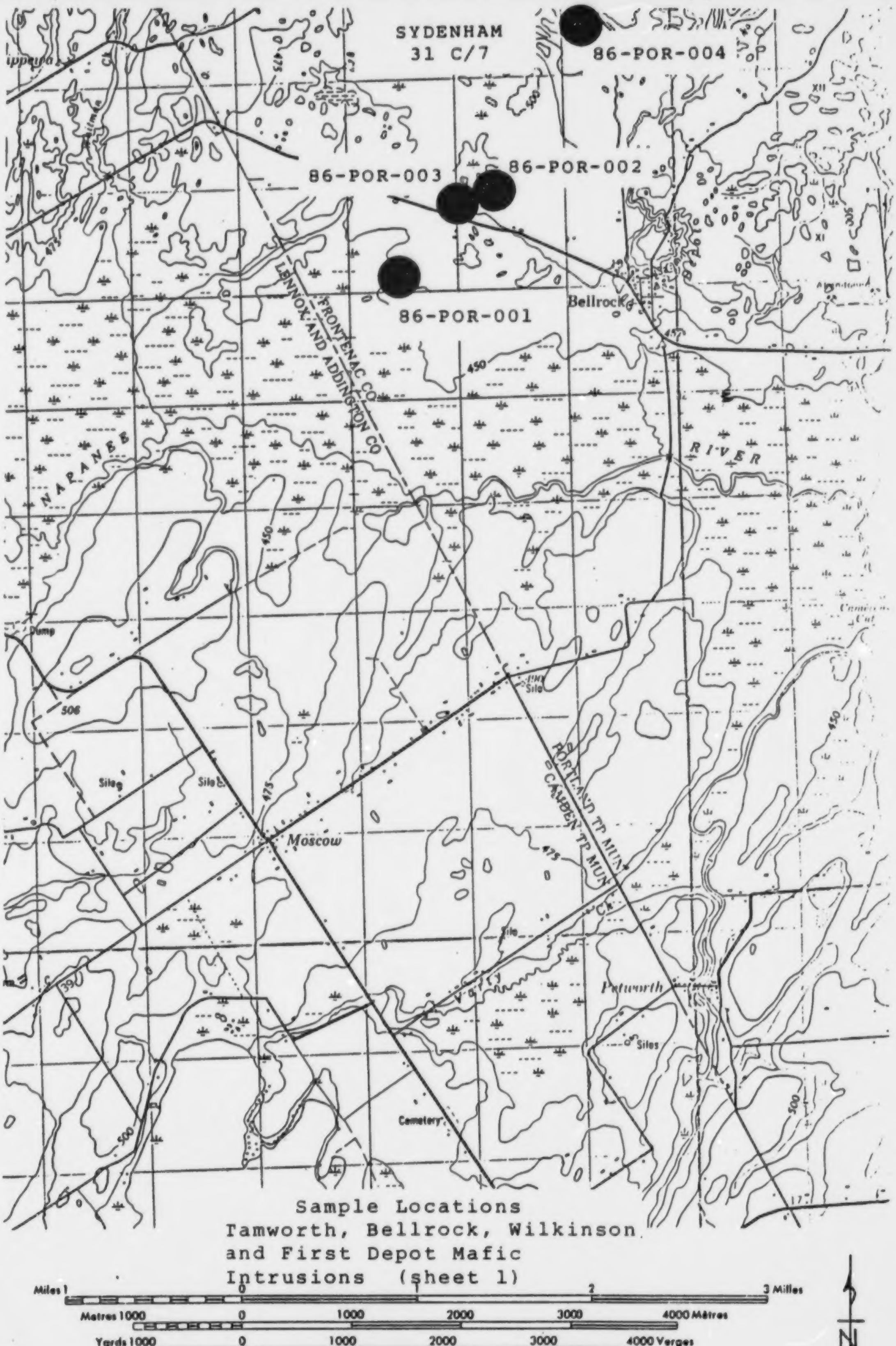
POTENTIAL

POOR		MODERATE	GOOD
	86-HIN-001		
86-CAM-001			
86-POR-001			
86-POR-002			
86-POR-003			
86-POR-004			

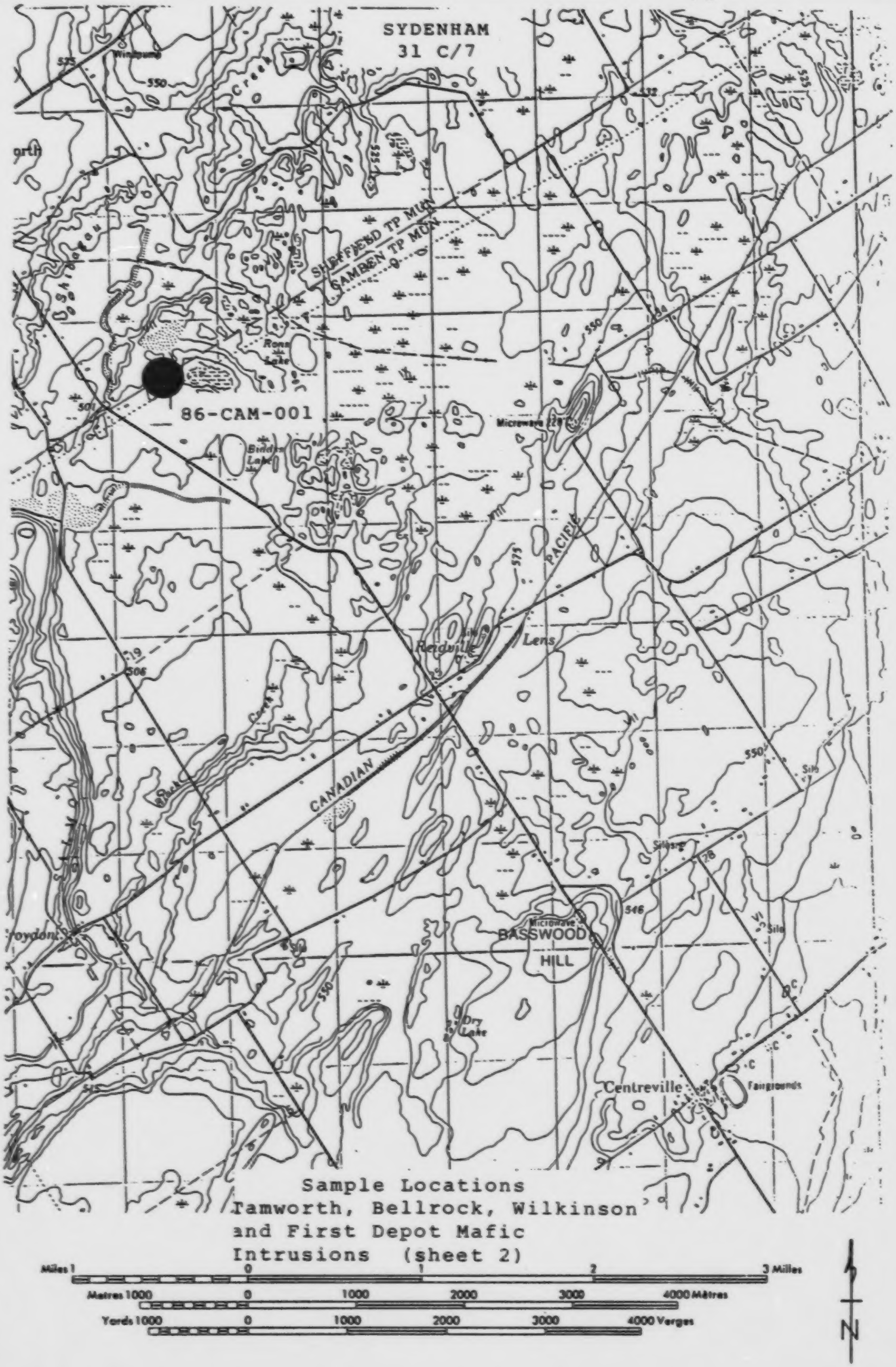
REFERENCES

Harrison, J.M.
1944: Anorthosites in Southeastern Ontario, Canada; Geological Society of America, Bulletin, Volume 55, Part 2, p.1401-1430.

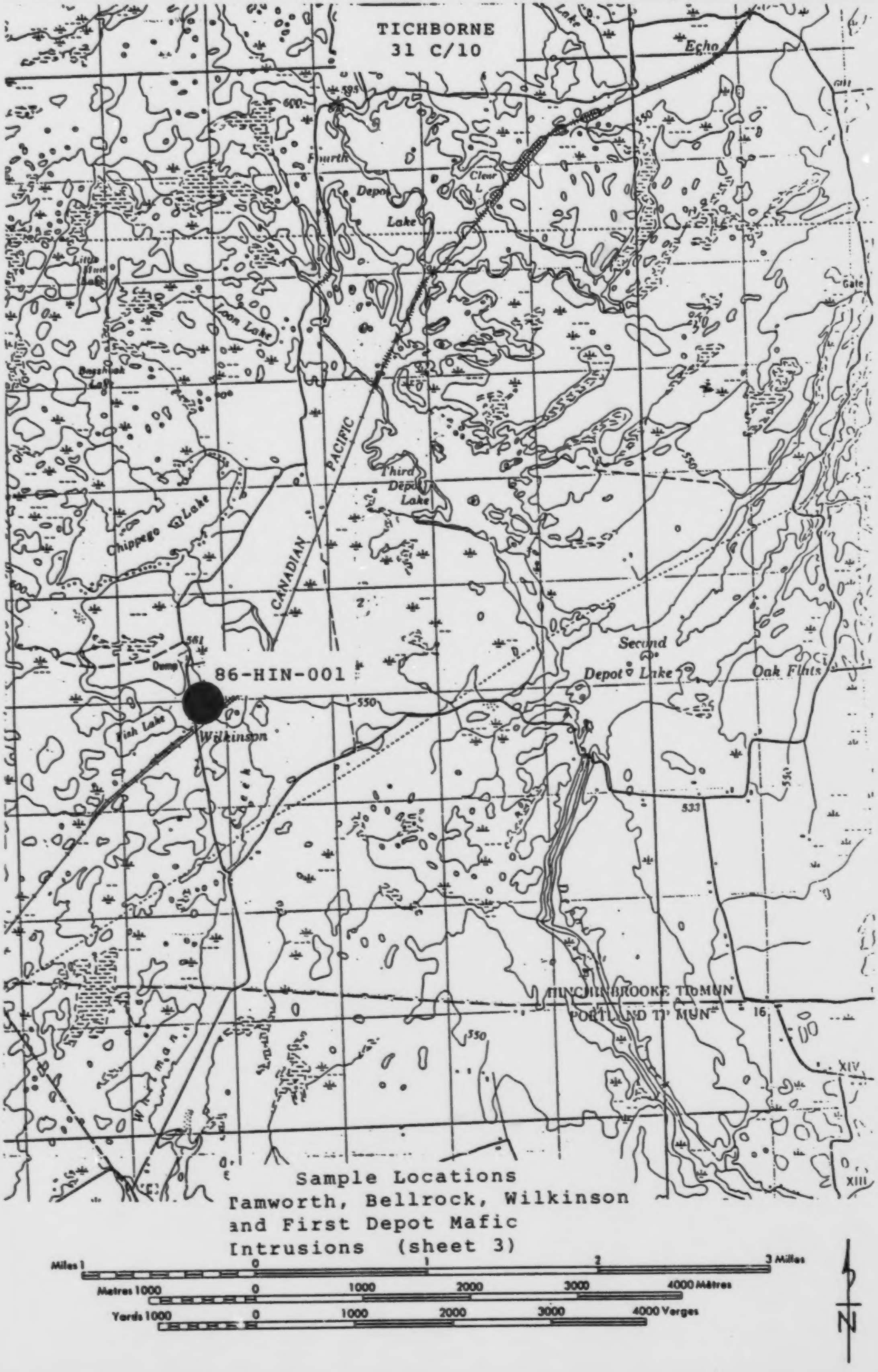
MacDonald, G.
1970: Geology-Kingston Area; Department of Geology, Carleton University, 1968-70.


SYDENHAM
31 C/7
86-POR-004
86-POR-003
86-POR-002
86-POR-001
Bellrock
FRONTENAC CO
LENNOX AND ADDINGTON CO
NAPANEE
RIVER
450
475
500
506
390
Dump
Silo
Silo
Silo
Siles
Moscow
PORTLAND TP MUN
CAMDEN TP MUN
Petworth
Cemetery
17
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Tamworth, Bellrock, Wilkinson
and First Depot Mafic
Intrusions (sheet 1)


SYDENHAM
31 C/7
86-CAM-001
SHEFFIELD TP MUN
CAMDEN TP MUN
Creek
Ronn Lake
Bidds Lake
Microwave
PACIFIC
CANADIAN
Reidville
Lens
BASSWOOD HILL
Microwave
Dry Lake
Centreville
Fairgrounds
Croydon
Silo
550
575
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Tamworth, Bellrock, Wilkinson
and First Depot Mafic
Intrusions (sheet 2)


TICHBORNE
31 C/10
Echo
595
600
550
Fourth
Depot
Lake
Clear L.
Loon Lake
Chippego Lake
CANADIAN
PACIFIC
Third Depot Lake
Gate
Second
Depot Lake
Oak Flats
561
Dump
86-HIN-001
550
Fish Lake
Wilkinson
533
HINCHINBROOKE TP MUN
PORTLAND TP MUN
16
350
XIV
XIII
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Tamworth, Bellrock, Wilkinson
and First Depot Mafic
Intrusions (sheet 3)

BUILDING STONE INVENTORY

Property No. 86-CAM-001 **Pluton Name** Tamworth Mafic Intrusion

Property Name Biddy's Lake **Commercial Stone Name** Granite

Geological Rock Name Diorite

Township Camden East **Lot** 23 **Con.** 9

NTS 31C/7 **UTM Co-ordinates: Easting** 343500 **Northing** 4926400

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark grey

Weathered Surface Light grey

Uniform **Variable** X

Weathering Depth: 2-8 mm

Grain Size: Fine **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: 50-60% Mafic

Deleterious Minerals: Yes No X Type Percent

Other Features: Black fine grained stringers

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good Fair Poor X

Comments: This rock is a fine grained dioritic rock. Outcrops are intensely weathered, intensely jointed, and contain numerous stringers, veins, and inclusions. Specularite coatings were also observed. These factors diminish the building stone potential of the rock at this site.

General view of outcrop showing major joint sets. 86-CAM-001

Close-up of intense irregular jointing. 86-CAM-001

BUILDING STONE INVENTORY

Property No. 86-POR-001 **Pluton Name** Bellrock Mafic Intrusion

Property Name Bellrock **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Portland **Lot** 21,22 **Con.** 11

NTS 31C/7 **UTM Co-ordinates: Easting** 357450 **Northing** 4926100

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Dark green

Weathered Surface Pink with grey

Uniform **Variable** X

Weathering Depth: 8 mm

Grain Size: Coarse **Uniform** **Variable** X

Texture: Massive **Uniform** **Variable** X

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 120 degrees **Dip** Vertical **Spacing** 4 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, biotite, minor pyroxene

Deleterious Minerals: Yes X **No** **Type** Sulphides **Percent** Trace

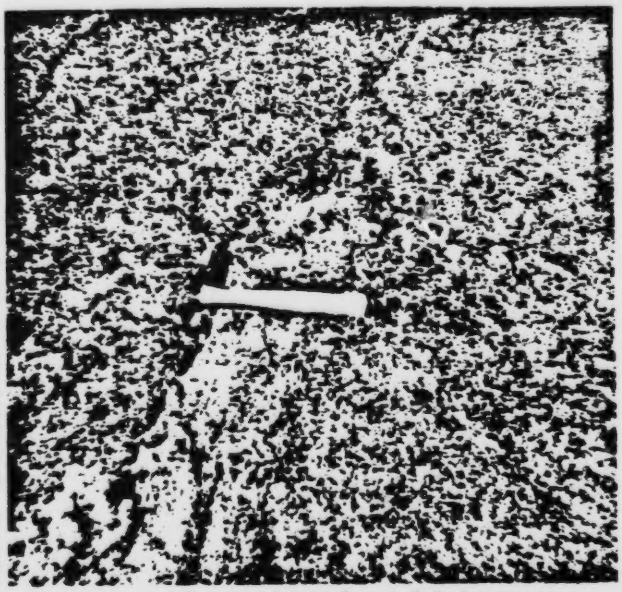
Other Features: Chalcopyrite, biotite with hematite staining

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good **Fair** X **Poor**

Comments: This sample is a dark green, coarse grained anorthosite which has undergone intense alteration. The area contains regular and irregular joint patterns of moderate intensity. Granitic dikes are associated with one regular joint set. The presence of sulphides and coarse, hematite stained biotite crystals further diminish building stone potential.

Overall view of outcrop showing moderate jointing and fair exposure. 86-POR-001



Close-up of weathered pinkish-grey surface of outcrop exhibiting massive texture. 86-POR-001

BUILDING STONE INVENTORY

Property No. 86-POR-002 **Pluton Name** Bellrock Mafic Intrusion

Property Name Bellrock 2 **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Portland **Lot** 21 **Con.** 12

NTS 31C/7 **UTM Co-ordinates: Easting** 358300 **Northing** 4920900

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Light grey with light brown

Weathered Surface Pink-orange with grey

Uniform X **Variable**

Weathering Depth: 2-5 mm

Grain Size: Medium to coarse **Uniform** X **Variable**

Texture: Prophyritic **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By -

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike E-W **Dip** Vertical **Spacing** .7 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, feldspar, biotite

Deleterious Minerals: **Yes** X **No** **Type** Biotite **Percent** 5%

Other Features: Hematite staining; limited, intense feldspar alteration

Possible Uses: Ornamental stone, crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This is a fairly well exposed outcrop of limited size. The rock is porphyritic with coarse plagioclase laths (to 2 cm in length) in a ground mass which includes a light green mineral of indeterminate mineralogy and secondary biotite. Limited hematite staining was observed. Jointing is moderate and occurs in both regular and irregular patterns. Despite the fact that this site has limited building stone potential, further study of the surrounding area is recommended.

Some of the biotite crystals are coarse. This may reduce the value of this rock as building stone material.

Extent of outcrop. 86-POR-002

BUILDING STONE INVENTORY

Property No. 86-POR-003 **Pluton Name** Bellrock Mafic Intrusion

Property Name Napanee Creek **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Portland **Lot** 22 **Con.** 12

NTS 31C/7 **UTM Co-ordinates: Easting** 358050 **Northing** 4916850

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark grey-light brown

Weathered Surface Pink-black-whitish

Uniform X **Variable**

Weathering Depth: 5 mm

Grain Size: Medium **Uniform** X **Variable**

Texture: Porphyritic **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 118 degrees **Dip** vertical **Spacing** 2 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, biotite

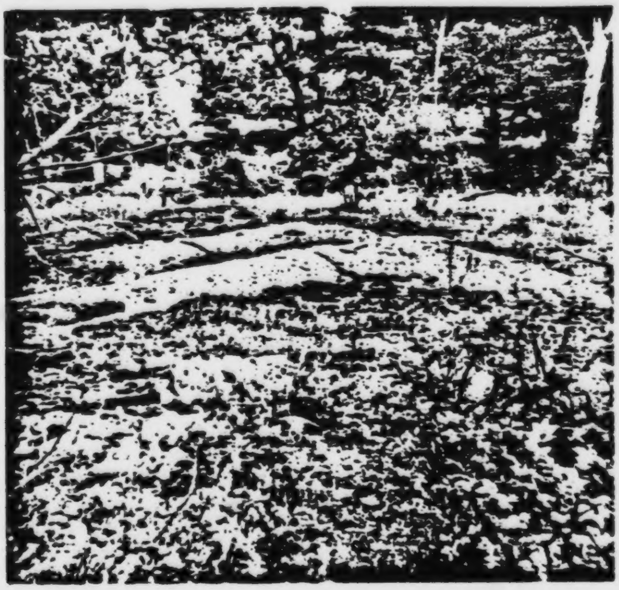
Deleterious Minerals: Yes X **No** **Type** Sulphides **Percent** ≤ 1

Other Features: Quartz stringers (1/2 cm), surface pitted uniformily, feldspar alteration (intense)

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good **Fair** X **Poor**

Comments: This outcrop forms part of the Bellrock Mafic Intrusion. The rock is an anorthosite with moderately sericitized plagioclase feldspar phenocrysts. Rare quartz and granitic stringers were observed. Sheeting further limits the building stone potential of this site; however, further study of surrounding areas is recommended.



Overall view of outcrop exhibiting fair exposure and moderate jointing.
86-POR-003

BUILDING STONE INVENTORY

Property No. 86-POR-004 **Pluton Name** First Depot Lake Mafic Intrusion

Property Name First Depot Lake **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Portland **Lot** 20 **Con.** 12, 13

NTS 31C/7 **UTM Co-ordinates: Easting** 358150 **Northing** 4928500

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Black with light brown and grey

Weathered Surface Red-orange with black and flesh colour

Uniform X **Variable**

Weathering Depth: .2-1 cm

Grain Size: Fine (medium) **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, (sericitization), biotite

Deleterious Minerals: **Yes** X **No** **Type** Sulphide **Percent** Trace

Other Features: Sheeting - very extensive jointing, feldspar phenocrysts, feldspar stringers, feldspar alteration, mafic dikes

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: The poor outcrop exposure at this site limits the interpretation of its building stone potential. This rock is a medium to coarse grained anorthosite that has undergone sericitization. The biotite component is also secondary. The mafic dikes contain pink felsic stringers and hematite staining on joint planes. Jointing is irregular and intense. This area shows little potential for building stone development.

Poor outcrop exposure exhibited at this site. 86-POR-004

BUILDING STONE INVENTORY

Property No. 86-HIN-001 **Pluton Name** Wilkinson Anorthosite

Property Name Wilkinson **Commercial Stone Name** Granite

Geological Rock Name Anorthosite

Township Hinchinbrooke **Lot** 5 **Con.** 10

NTS 31C/10 **UTM Co-ordinates: Easting** 355750 **Northing** 4934000

Property Status Prospect **Air Photo No.** 78-4438-126-167

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dark greyish-black

Weathered Surface Brown

Uniform X **Variable** (X) Greenish to beige

Weathering Depth: up to 1 cm

Grain Size: Coarse **Uniform** **Variable** X

Texture: Massive to (porphyritic) **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 100 degrees **Dip** 90 degrees S **Spacing** 1 m - (1/2 m)

B) Strike 180 degrees **Dip** 40 degrees W **Spacing** 2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Plagioclase, biotite,

Deleterious Minerals: **Yes** X **No** **Type** Hematite **Percent** Trace

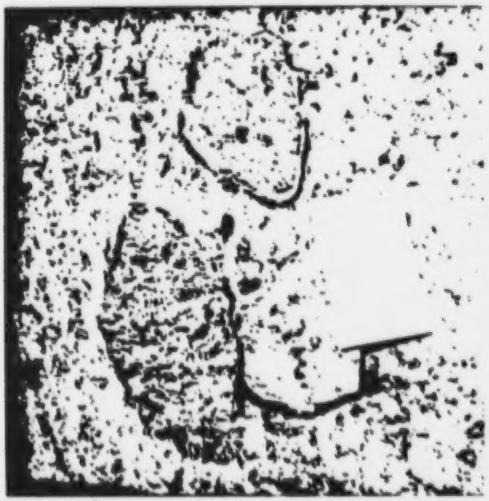
Other Features: Some syenitic to mafic xenoliths observed; moderately abundant granitic stringers and pegmatite dikes (max 10 m wide). Reddish hematite staining (1/2 m); occasional quartz veining (2-3 cm wide); feldspar alteration

Possible Uses: Curbing stone, ornamental stone, landscaping stone, paving stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: Hewitt (1964) classified this rock as an anorthosite. Much of the original plagioclase has undergone sericitization however some plagioclase phenocrysts have retained fresh surfaces. The average size of plagioclase laths is about 3 cm. The sericitized portion of the rock is a light green colour of indeterminate mineralogy. The variation in colour and texture (the result of alteration), the presence of granitic to pegmatitic stringers, and the intense jointing limit the building stone potential of this intrusion.

View showing jointing and fair outcrop exposure. 86-HIN-001



Syenitic to mafic xenoliths observed in outcrop. 86-HIN-001

THE RIDGE GRANITE

LOCATION: SOUTH END OF WOLLASTON TOWNSHIP, ON THE MURPHY CORNERS ROAD 1 KM EAST OF THE RIDGE
NTS 31C/13 OGS MAP #2020
GEOLOGICAL REPORT #11

SAMPLE SITES: 86-WOL-012

DESCRIPTION OF AREA

The Ridge Granite is described by Hewitt (1962, p.45) as follows:

"A small sill-like body of pink, coarse-grained leucogranite, with accessory biotite and hornblende, occurs on the northeast flank of The Ridge dome."

The sample site shows a red granite with intense irregular jointing, quartz veining, and exfoliation, all of which make the intrusion a poor prospect for building stone.

CONCLUSIONS

The Ridge granite has low potential for building stone.

POTENTIAL

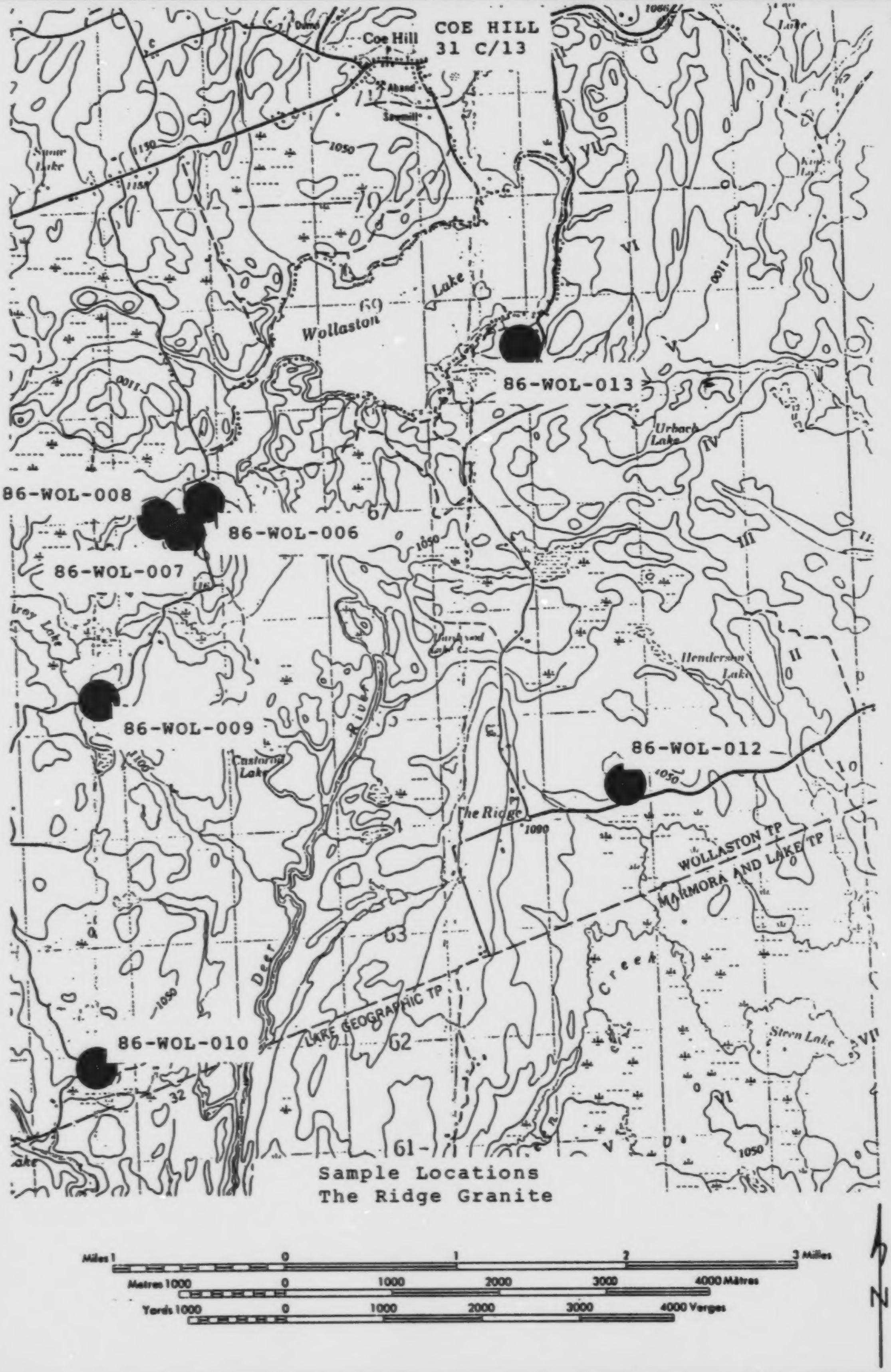
POOR	MODERATE	GOOD
86-WOL-012		

REFERENCES

Davidson, A., Britton, J.M., Bell, K., and Blenkinsop, J.
1979: Regional Synthesis of the Grenville Province of Ontario and Western Quebec; in Current Research, Part B, Geological Survey of Canada, Paper 79-1B, p.153-262.

Hewitt, D.F.
1962: Geology of Wollaston Township; p.29-55 in OGS Geological Report 11, Chandos Township and Wollaston Township.

MacDonald, G.
1970: Geology-Kingston Area; Department of Geology, Carleton University, 1968-70.


COE HILL
31 C/13
Coe Hill
Sawmill
Wollaston Lake
86-WOL-013
Urbach Lake
86-WOL-008
86-WOL-006
86-WOL-007
Henderson Lake
86-WOL-009
Castor Lake
Deer River
86-WOL-012
The Ridge
WOLLASTON TP
MARMORA AND LAKE TP
LAKE GEOGRAPHIC TP
Creek
Steen Lake
86-WOL-010
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
The Ridge Granite

BUILDING STONE INVENTORY

Property No. 86-WOL-012 **Pluton Name** The Ridge Granite

Property Name The Ridge **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Wollaston **Lot** 16 **Con.** 1

NTS 31C/13 **UTM Co-ordinates: Easting** 277750 **Northing** 4964350

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Red

Weathered Surface Orange-pink

Uniform **Variable** X

Weathering Depth: up to 2 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) **Strike** 56 degrees **Dip** Vertical **Spacing** 10 cm to 1 m

B) **Strike** **Dip** **Spacing**

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, quartz, amphibole, plagioclase

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Rare groupings of amphibole crystals (to 1 cm in diameter) quartz veins (15 cm width maximum), horizontal exfoliation on the 5-10 cm scale

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: The proportion of mafic minerals throughout this rock varies to some extent. Hence, the colour of this rock is variable. Building stone potential is limited by horizontal exfoliation, vertical jointing, and quartz veins. This outcrop is fairly typical of the granitic rocks in the Ridge Granite.

Overall view of outcrop area
showing fair outcrop exposure.
86-WOL-012

UMFRAVILLE GABBRO

LOCATION: NORTHWEST CORNER OF WOLLASTON TOWNSHIP, NORTHEAST CORNER OF LIMERICK TOWNSHIP
NTS 31C/13 OGS MAP 2020, 2167
GEOLOGICAL REPORT # 11, 67

SAMPLE SITES: 86-WOL-004, 86-WOL-005

DESCRIPTION OF THE AREA

The Umfraville Gabbro is an area of relatively high elevation compared to the surrounding areas and outcrop exposure is fairly good, as is access via the Ragged Lake Road.

Two areas were sampled, both to the north of Ragged Lake. The first (86-WOL-004) is a greyish-beige coarse grained gabbro, the second (86-WOL-005), is possibly a metadiorite or metagabbro.

Jointing in the area is moderate and varies from regular to irregular. The spacing between joints ranges up to three metres; however at 86-WOL-004, one joint-free area nine metres wide was encountered. Horizontal sheeting appears to be limited.

Undesirable features of the area include some pegmatite dykes (up to 2 m wide) and rare quartz stringers. At 86-WOL-004, the presence of very fine-grained mafic dykes and muscovite reduce the potential for building stone.

CONCLUSIONS

While the rock in this area appears to have enough appeal asthetically for building stone, there are too many factors which render it unsuitable, such as deleterious muscovite in sample #86-WOL-004. In the case of 86-WOL-005, varying grain size and the nature of the jointing limit the potential uses to small blocks such as paving stones.

POTENTIAL

POOR	MODERATE	GOOD
86-WOL-004 86-WOL-005		

REFERENCES

Hewitt, D.F.

1956: The Grenville Region of Ontario; in the Grenville Problem, Royal Society of Canada, Special Publication 1, p.22-41.

1959: Geology of Cardiff and Faraday Townships, Haliburton and Hastings Counties, Ontario; Ontario Department of Mines, Annual Report, 1957, Volume 66, Part 3.

1962: Geology of Wollaston Township, Hastings County, Ontario; Ontario Department of Mines, Geological Report 11.

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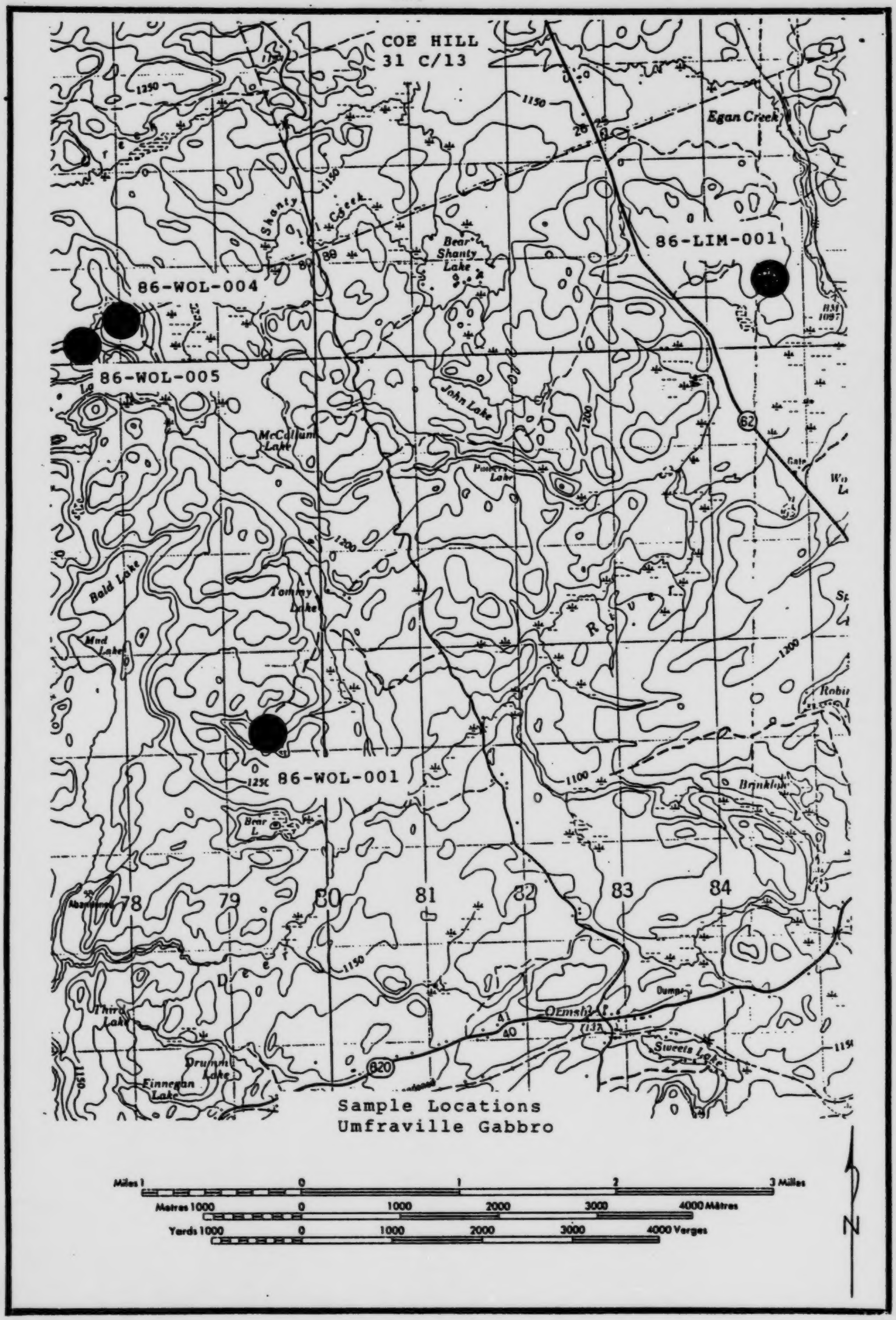
COE HILL
31 C/13
86-LIM-001
86-WOL-004
86-WOL-005
86-WOL-001
Egan Creek
Shanty Creek
Bear Shanty Lake
John Lake
McCallum Lake
Bald Lake
Tommy Lake
Mud Lake
Bear L.
Third Lake
Drumm Lake
Finnegan Lake
Sweets Lake
Brinklow
Dumps
Gate
62
620
132
1150
1200
1250
1100
78
79
80
81
82
83
84
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Umfraville Gabbro

BUILDING STONE INVENTORY

Property No. 86-WOL-004 **Pluton Name** Umfraville Gabbro

Property Name Wollaston Faraday Twp. **Commercial Stone Name** Granite

Geological Rock Name Gabbro (possibly anorthositic)

Township Wollaston **Lot** 3 **Con.** 16

NTS 31C/13 **UTM Co-ordinates: Easting** 378050 **Northing** 4980400

Property Status Prospect **Air Photo No.** 77-4439-160-161

Production History None

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Greyish beige

Weathered Surface Grey-pink

Uniform X **Variable**

Weathering Depth: 1-2 mm

Grain Size: Coarse **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 150 degrees **Dip** Vertical **Spacing** $\leq$9 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, quartz, muscovite, biotite

Deleterious Minerals: **Yes** X **No** **Type** Muscovite **Percent** Trace

Other Features: Pegmatite dikes 2 m wide; quartz stringers (rare); limited horizontal sheeting; mafic dikes.

Possible Uses: Ashlar, curbing stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This area is found north of Ragged Lake on the Wollaston-Faraday township line. The outcrop is a coarse grained, massive, anorthositic gabbro containing plagioclase, quartz, biotite and muscovite. Fresh surface is a greyish beige (uniform) and weathers to a depth of no more than 2 mm. The area is regularly and irregularly jointed. Mafic dikes, quartz stringers and pegmatite dikes were observed. Limited horizontal sheeting was also noted. The features described above limit the potential of this area as a building stone site.

Overall view of outcrop exhibiting fair outcrop exposure. 86-WOL-004

BUILDING STONE INVENTORY

Property No. 86-WOL-005 **Pluton Name** Umfraville Gabbro

Property Name Ragged Lake **Commercial Stone Name** Granite

Geological Rock Name Gabbro

Township Wollaston **Lot** 4,5 **Con.** 16

NTS 31C/13 **UTM Co-ordinates: Easting** 377600 **Northing** 4930200

Property Status Prospect **Air Photo No.** 77-4439-16-161

Production History None

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Black

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth:

Grain Size: Fine to coarse **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike	0 degrees	**Dip**	Vertical	**Spacing**	2-3 m
B) Strike	120 degrees	**Dip**	Vertical	**Spacing**	.5-2 m
C) Strike		**Dip**		**Spacing**	
D) Strike		**Dip**		**Spacing**	

Potential For Quarry Blocks: Poor

Mineralogy: Hornblende, quartz, feldspar, plagioclase, some biotite.

Deleterious Minerals: **Yes** X **No** **Type** Biotite **Percent**

Other Features: Granitic dyke, surface of outcrop appears somewhat pitted and gouged. Some severe horizontal jointing.

Possible Uses: Ashlar, crushed stone.

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: Building stone potential at this area is low due to the nature of the jointing and fracturing, and varying grain size and texture.

Overall view of outcrop. Note moderate horizontal jointing.
86-WOL-005

WADSWORTH TRONDHJEMITE

LOCATION: North east corner of Tudor township, approximately 1 mile north-east of Gilmour.
NTS 31C/13 OGS MAP 2168
GEOLOGICAL REPORT # 67

SAMPLE SITES: 86-TUD-01, 86-TUD-02

DESCRIPTION OF AREA

Lithologies observed in this intrusion include trondjemite and amphibole-rich trondjemite comprised mainly of plagioclase, quartz and hornblende/biotite. Although compositionally less diverse than the Beaver Creek or Glanmire Complexes, the Wadsworth intrusion suffers from poor exposure and moderate to intense jointing.

CONCLUSIONS

Further access may be achieved by boat from the north shore of Wadsworth Lake but does not appear warranted on the basis of expected available exposure and intensity of jointing. The potential for building stone, albeit better than Beaver Creek or Glanmire, is still poor. Uses are limited to paving stone and ashlar.

POTENTIAL

POOR	MODERATE	POOR
86-TUD-001		
86-TUD-002		

REFERENCES

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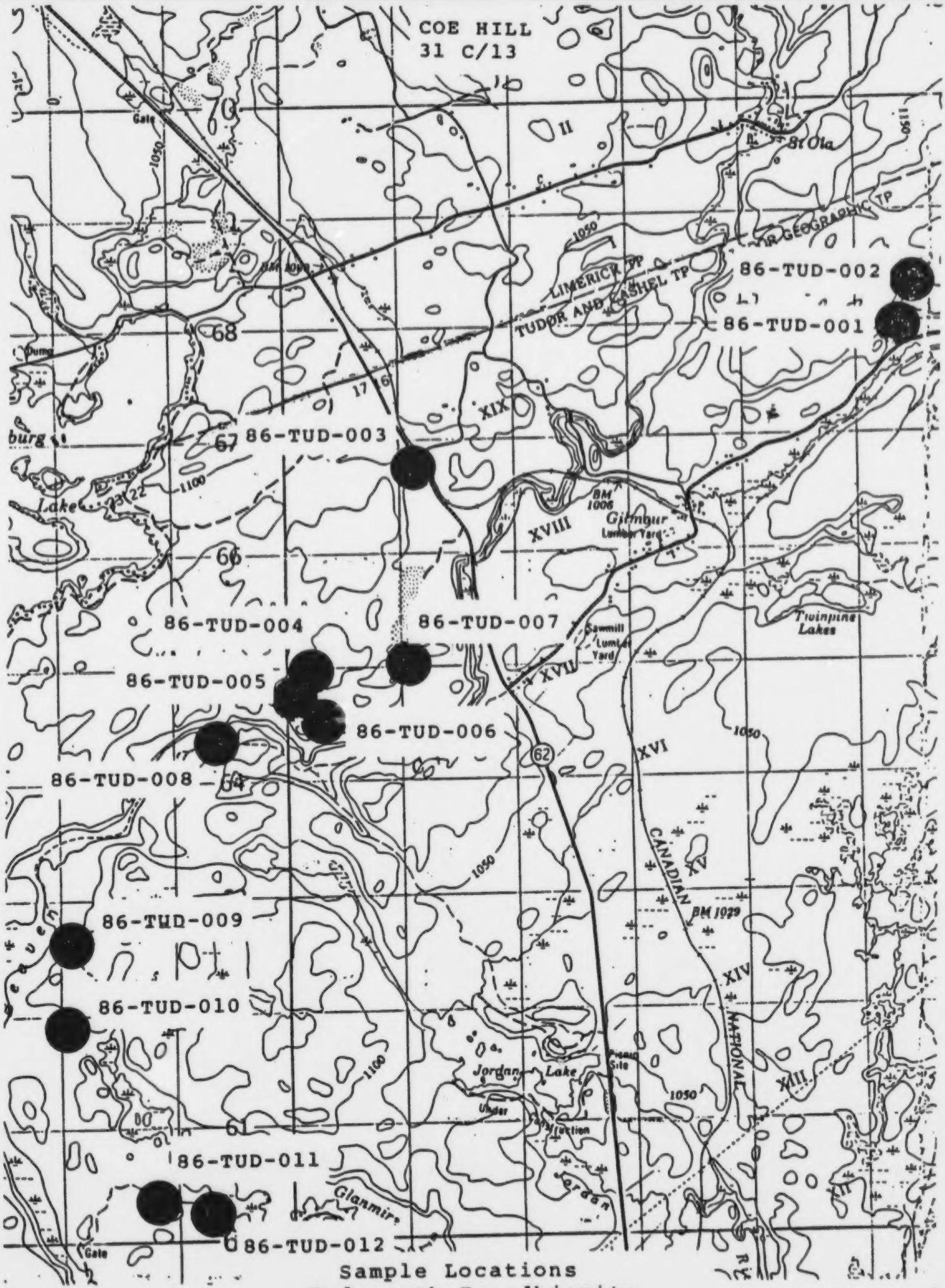

COE HILL
31 C/13
86-TUD-002
86-TUD-001
86-TUD-003
86-TUD-004
86-TUD-007
86-TUD-005
86-TUD-006
86-TUD-008
86-TUD-009
86-TUD-010
86-TUD-011
86-TUD-012
St Ola
LIMERICK TP
TUDOR AND CASHEL TP
GEOGRAPHIC TP
Gilmour
Lumber Yard
Sawmill
Twinpine Lakes
Jordan Lake
Glanmire
CANADIAN
NATIONAL
62
1050
1100
Miles 1
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Wadsworth Trondhjemite

BUILDING STONE INVENTORY

Property No. 86-TUD-001 **Pluton Name** Wadsworth Trondhjemite

Property Name Westsworth Lake-1 (gravel pit) **Commercial Stone Name** Granite

Geological Rock Name Amphibole Trondhjemite

Township Tudor **Lot** 6 **Con.** 19

NTS 31C/13 **UTM Co-ordinates: Easting** 295400 **Northing** 4968000

Property Status Prospect **Air Photo No.** 78-4458-190-215

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface White (with dark hornblende)

Weathered Surface Greyish white

Uniform X **Variable**

Weathering Depth: $\leq$ 3/4 cm

Grain Size: Medium **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable** (X)

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** Dip

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** X **Intensive Jointing** (X)

	A) Strike 160 degrees	**Dip** 90 degrees	**Spacing** 1 m
Sub-horizontal	**B) Strike** 020 degrees	**Dip** 20 degrees N	**Spacing** 1 m
	C) Strike 040 degrees	**Dip** 90 degrees	**Spacing** ?
	D) Strike	**Dip**	**Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, hornblende

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

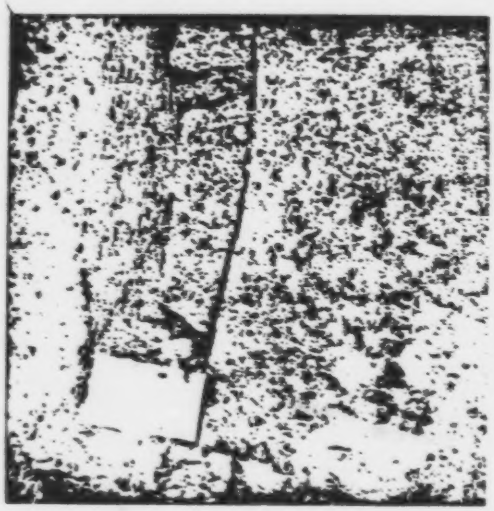
Other Features: One granitic stringer observed

Possible Uses: Paving stone, ashlar, landscaping stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a massive medium grained amphibole trondhjemite. The rocks are intensely jointed in this area.

General appearance of outcrop. Note vertical and subhorizontal jointing. 86-TUD-001



Close-up of massive texture, medium grain size and grey-white colour. 86-TUD-001

BUILDING STONE INVENTORY

Property No. 86-TUD-002 **Pluton Name** Wadsworth Trondhjemite

Property Name Wadsworth Lake-2 (Boyd Property) **Commercial Stone Name** Granite

Geological Rock Name Trondhjemite

Township Tudor **Lot** 5 **Con.** 19

NTS 31C/13 **UTM Co-ordinates: Easting** 295450 **Northing** 4968400

Property Status Prospect **Air Photo No.** 78-4459-190&41

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Grey

Weathered Surface White

Uniform X **Variable**

Weathering Depth: ≤ 3/4 cm

Grain Size: Medium **Uniform** X **Variable** (X)

Texture: Massive to weakly foliated **Uniform** X **Variable** (X)

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** **Strike** 30 degrees **Dip** 90 degrees

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern (X) **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike 030 degrees **Dip** 90 degrees **Spacing** 0.5 m

B) Strike 100 degrees **Dip** 90 degrees **Spacing** 1-2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Epidotized slip planes observed; penetrative cleavage associated with foliation.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair Poor X

Comments: This rock is a greenish grey, medium grained trondhjemite. It contains both regular and irregular joint patterns which are closely spaced. A penetrative cleavage corresponds to the foliation. Outcrop exposure is extremely limited.

Overall view showing limited outcrop exposure. 86-TUD-002

WESLEMKOON GRANITE

LOCATION: PARTS OF GRIMSTHORPE, CASHEL, MAYO, ASHBY, EFFINGHAM, ABINGER, AND
DENBIGH TOWNSHIPS
NTS 31C/14, 31F/3 OGS MAP #2049, 2142
GEOLOGICAL REPORT #26, 71

SAMPLE SITES: 86-DEN-001

DESCRIPTION OF AREA:

The Weslemkoon batholith is described by Lumbers (1968, p.23-25) as follows:

"In plan, the batholith is mushroom-shaped with a roughly circular northern lobe about 22 km in diameter, and a gently curved, elongate southern lobe, about 16 km long and 6 km wide, which extends southward from the south-central part of the northern lobe."

"Along the southern and western margins of the northern lobe, discontinuous narrow zones of contaminated gabbro and diorite separate the granitic rocks of the batholith from the surrounding metavolcanics."

"Near the margins of the southern lobe, granitized and migmatitic country rocks are absent, and contaminated border phases of the batholith are rare.

The northern lobe shows a poorly defined compositional zoning and consists mainly of trondhjemite, granodiorite, and tonalite; sodic granite and granodiorite are concentrated near the western and central parts of the lobe and are partly surrounded by a zone rich in tonalite. Elsewhere in the northern lobe, trondhjemite predominates, but, locally near the margins of the lobe, concentrations of granodiorite are present. Trondhjemite and granodiorite constitute most of the southern lobe, but the areal distribution of these phases is more random than in the northern lobe."

"Granitic rocks of the northern lobe are intensely foliated with abundant schlieren and granitic gneisses which are best developed near the marginal and central parts of the lobe. Gneissosity is caused by elongated quartz and plagioclase aggregates and by discontinuous biotite-rich layers only a few millimetres thick. In the southern lobe, the granitic rocks are less intensely foliated than in the northern lobe, and, locally, near the central part of the lobe these rocks are massive. In unweathered outcrops of the granitic rocks within both lobes, compositional layering parallel to the foliation is present and is marked by biotite-rich and biotite-poor layers as much as three feet thick; in places a colour banding is present in which grey bands containing magnetite as the chief accessory iron-titanium oxide mineral alternate with pink bands containing hematite as the chief accessory iron-titanium oxide mineral."

CONCLUSIONS

Sample site 86-DEN-001 is not representative of the batholith as a whole. However, due to marginal contamination, compositional variation and foliation as described by Lumbers, the potential for building stone is low. There may be higher potential in the central part of the southern lobe, where the rock is more massive, but access to this area is poor.

POTENTIAL

POOR MODERATE GOOD

86-DEN-001

REFERENCES

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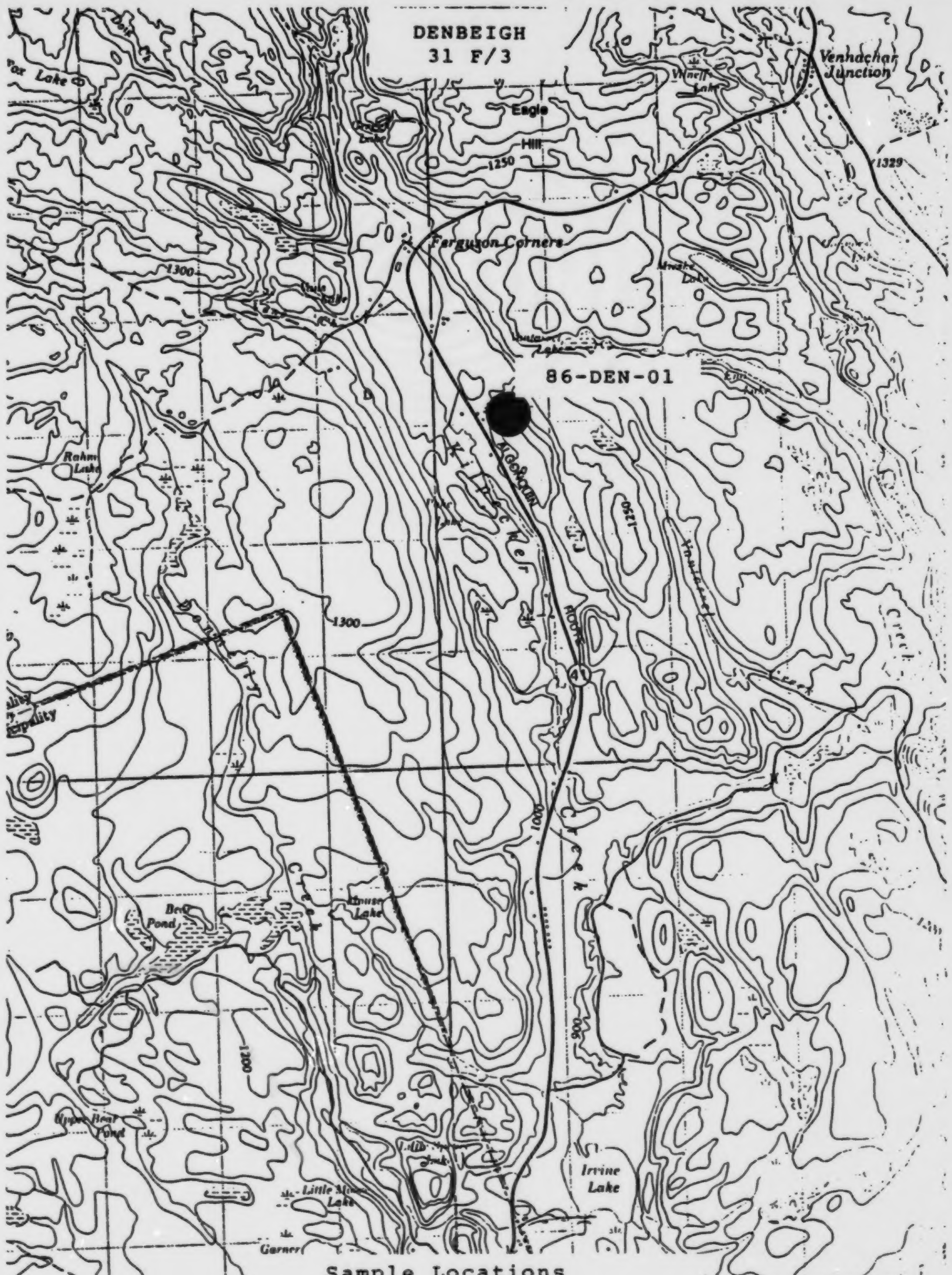
DENBEIGH
31 F/3
Fox Lake
Eagle
Hill
1250
Vennachar Junction
1329
Ferguson Corners
1300
86-DEN-01
Rahm Lake
1300
41
1000
Bear Pond
Mouse Lake
1200
900
Upper Bear Pond
Irvine Lake
Little Mouse Lake
Garner
1150

Sample Locations
Weslemkoon Granite

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-DEN-001 **Pluton Name** Weslemkoon Granite

Property Name Cecil Miski **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Denbigh **Lot** 4 **Con.** East Range

NTS 31F/03 **UTM Co-ordinates: Easting** 320600 **Northing** 4993150

Property Status Inactive **Air Photo No.** 78-4505-107-7

Production History Roadcut

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface Salt & pepper - grey-white

Weathered Surface Salt & pepper - grey-white

Uniform X **Variable**

Weathering Depth: Nil

Grain Size: Fine to medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod. Strong** X **Strike Dip**

Formed By Foliation

Bedding: Yes No X **Strike Dip Avg. Thickness**

Jointing: Regular Pattern Irregular Pattern

Limited Jointing Moderate Jointing Intensive Jointing

A) Strike Dip Spacing

B) Strike Dip Spacing

C) Strike Dip Spacing

D) Strike Dip Spacing

Potential For Quarry Blocks: Poor

Mineralogy: Quartz, biotite

Deleterious Minerals: Yes No X Type Percent

Other Features: Quartz stringers - small outcrop or drift

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good Fair Poor X

Comments: The granite found on this property is a fine to medium grained, foliated, salt and pepper coloured rock consisting essentially of quartz and biotite.

Due to the nature of the outcrop, which appears to be float, jointing cannot be assessed. A bush road has also been constructed through the area and blasting fractures further hinder accurate interpretation of jointing. Small quartz stringers were noted in the rock and this further limits the potential of this area for building stone applications. Possible uses for this stone include ashlar and crushed stone.

Overall view of outcrop. 86-DEN-001

View of fresh surface showing texture and colour. 86-DEN-001

WESTPORT PLUTON

LOCATION: NORTH SHORE OF UPPER RIDEAU LAKE WITHIN NORTH CROSBY TOWNSHIP
NTS 31C/9 OGS MAP 2054

SAMPLE SITES: 86-NCROS-001, 86-NCROS-002

DESCRIPTION OF THE AREA

The Westport Pluton is a fairly large granitic body found on the north shore of Upper Rideau Lake. This pluton consists predominantly of pegmatite with very little granite. The rocks that are granitic appear to be aplites or granites with large biotite crystals that would pluck out upon polishing. The rock here is not attractive and the intense jointing indicates low potential for the extraction of large quarry blocks. It is doubtful that further investigation of this area would yield an area with good potential.

CONCLUSIONS

Very low potential for building stone in this pluton.

POTENTIAL

POOR	MODERATE	GOOD
86-NCROS-001 86-NCROS-002		

REFERENCES

Baker, M.B.
1923: Geology and Minerals of the County of Leeds, Ontario; Ontario Department of Mines, Annual Report, 1922, Volume 31, Part 6.

Davidson, A., Britton, J.M., Bell, D., and Blenkinsop, J.
1979: Regional Synthesis of the Grenville Province of Ontario and Western Quebec; in Current Research, Part B, Geological Survey of Canada, Paper 79-1B, p.153-262.

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Krogh, T.E. and Hurley, P.M.
1968: Strontium Isotope Variation and Whole-Rock Isochron Studies, Grenville Province of Ontario; Journal of Geophysical Research, Volume 73, p.7107-7125.

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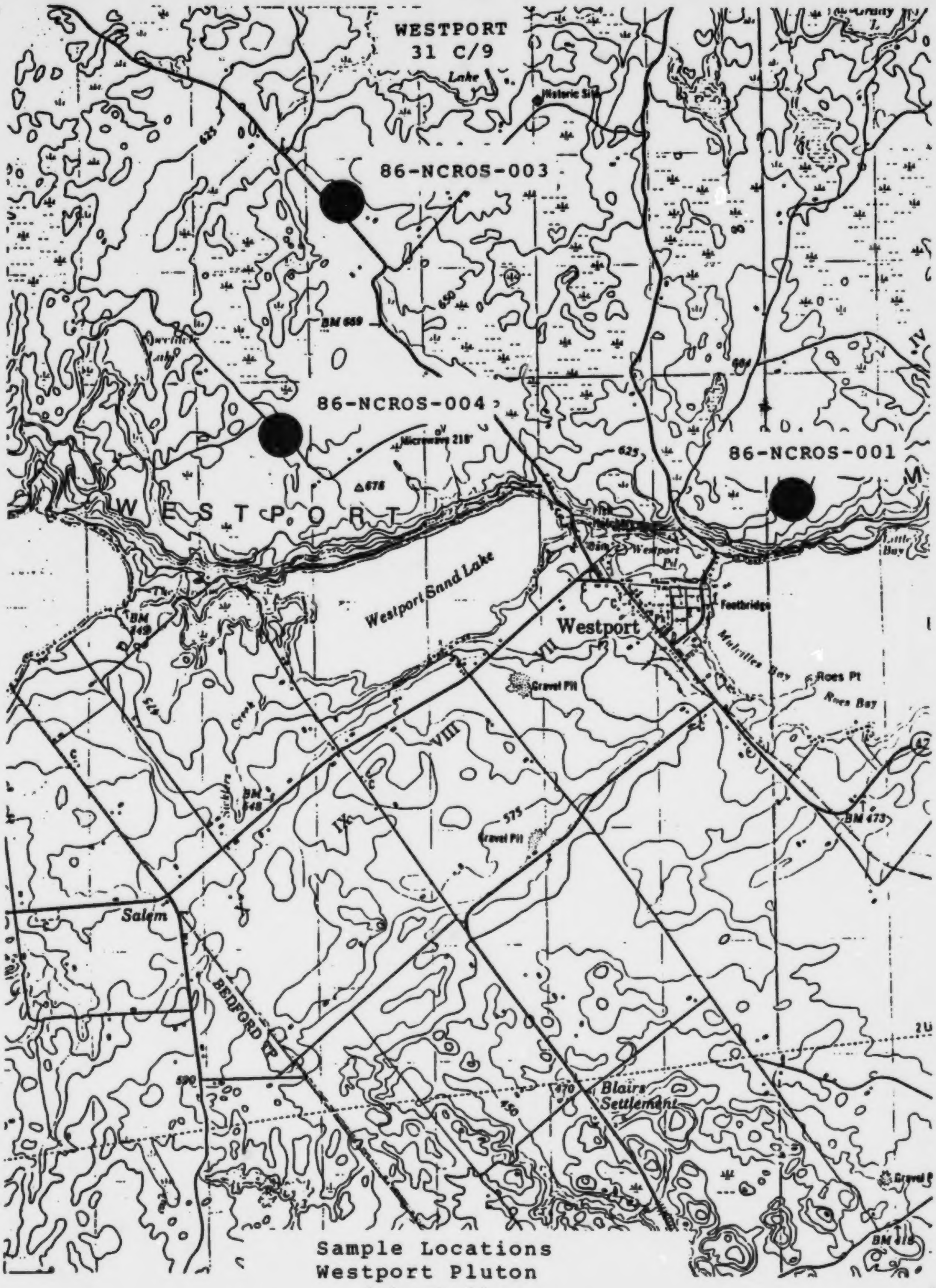
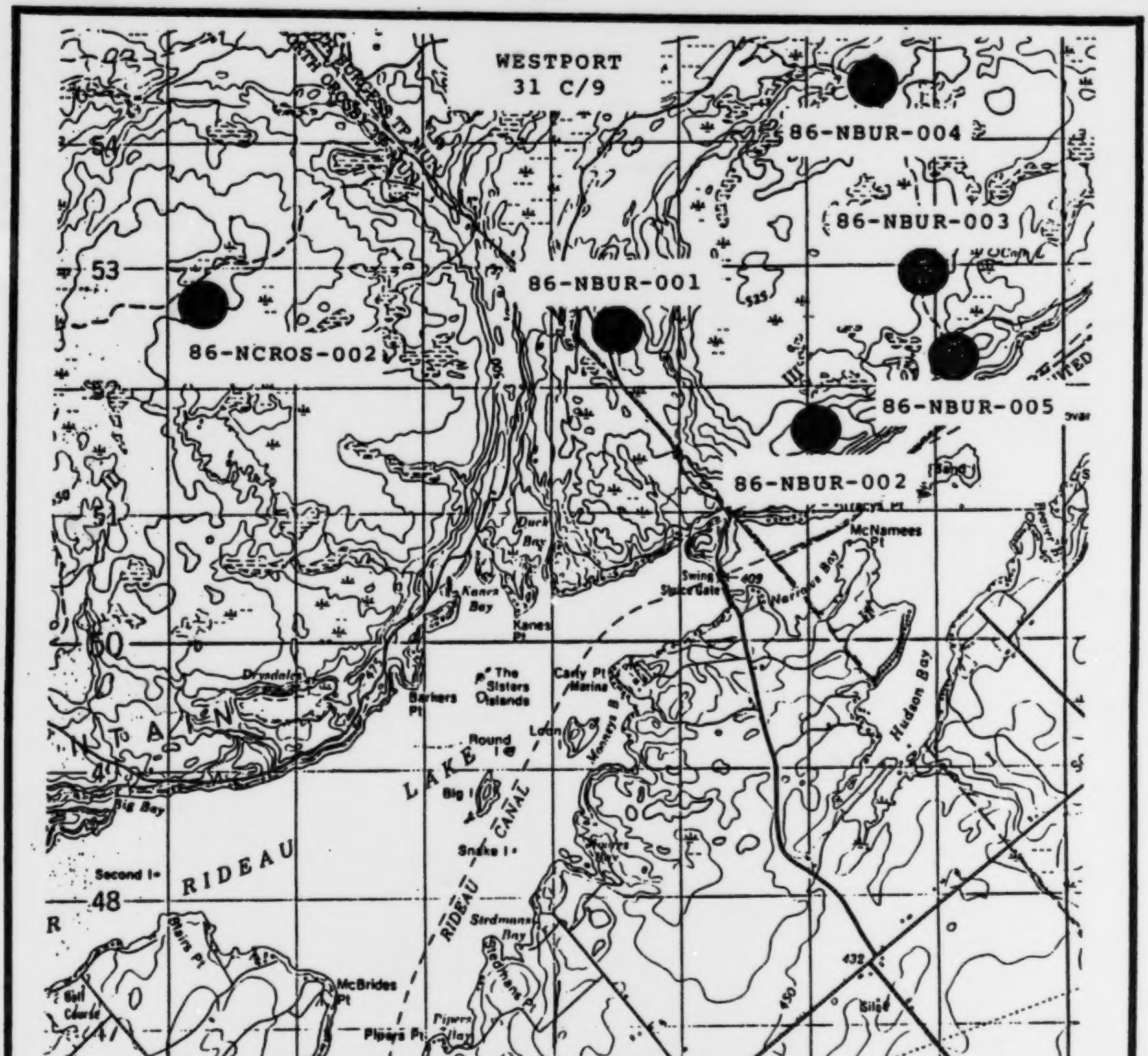

WESTPORT
31 C/9
86-NCROS-003
86-NCROS-004
86-NCROS-001
W E S T P O R T
Westport Sand Lake
Westport
Historic Site
Microwave 218'
BM 659
Footbridge
Roes Pt
Roes Bay
Gravel Pit
Salem
BEDFORD TP
Blairs Settlement
BM 473
BM 548
VIII
IX

Sample Locations
Westport Pluton
(sheet 1)

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N


WESTPORT
31 C/9
86-NBUR-004
86-NBUR-003
86-NBUR-001
86-NCROS-002
86-NBUR-005
86-NBUR-002
RIDEAU
LAKE
RIDEAU CANAL
Newboro'
Hudson Bay
McNallys Bay
The Bog
Big I
Round I
Snake I
Second I
McBrides Pt
Pipers Pt
Kanes Bay
Barkers Pt
The Sisters Islands
Cady Pt Marina
McNamees Pt
Swing Sluice Gate
Stedmans Bay
McCaskill
Wright
Mackay
Cherry
Big Bay
Crosby
53
52
51
50
49
48
47
46
45
44
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Westport Pluton
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-NCROS-001	**Pluton Name** Westport Pluton
Property Name RVCA	**Commercial Stone Name** Granite
	Geological Rock Name Monzonite

Township North Crosby **Lot** 11 **Con.** 6

NTS 31C/9 **UTM Co-ordinates: Easting** 390150 **Northing** 4948900

Property Status Prospect **Air Photo No.** 78-4448-12[illegible]92

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pink brown

Weathered Surface Light pink

Uniform **Variable** X

Weathering Depth: 1-1.5 cm

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 148 degrees **Dip** **Spacing** 1 m

B) Strike 58 degrees **Dip** **Spacing** 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite; Mafic content: approx. 15-20%

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

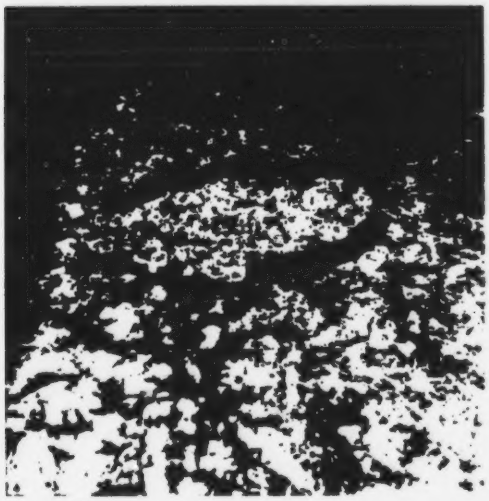
Other Features: Numerous pegmatite dikes, minor alteration, hematite staining

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This rock is a pinkish brown, massive monzonite of the Westport Pluton. It has a medium grain size but contains some feldspar megacrysts. Pegmatite phases were observed in the area. The building stone potential of this rock is further limited by the presence of intense regular and irregular joint patterns and hematite staining.

Overall view of outcrop showing some of the joint patterns. 86-NCROS-001



Fresh surface also showing pegmatite found in area. 86-NCROS-001

BUILDING STONE INVENTORY

Property No. 86-NCROS-002 **Pluton Name** Westport Pluton

Property Name Core Area **Commercial Stone Name** Granite

Geological Rock Name Granite

Township North Crosby **Lot** 13 **Con.** 2

NTS 31C/9 **UTM Co-ordinates: Easting** 393250 **Northing** 4952750

Property Status Prospect **Air Photo No.** 78-4450-131-83

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: 1-1.5 cm

Grain Size: Fine to coarse **Uniform** **Variable** X

Texture: Massive porphyritic to gneissic **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** X **Mod.** **Strong** (X) **Strike** **Dip**

Formed By Alignment of biotite + gneissosity

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**
B) Strike **Dip** **Spacing**
C) Strike **Dip** **Spacing**
D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, quartz, biotite, K-spar

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Numerous quartz pods, pegmatite dikes cover 20% of exposure: mafic inclusions, quartz veins

Possible Uses: Limited; not suitable for dimension stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This outcrop is a pink granite from the centre of the Westport Pluton. Several areas of the Westport Pluton were observed and this site is representative of the sites evaluated. Inconsistent mineralogy, texture and grain size characterize this granitic rock, limiting its use for building stone.

Overall view of outcrop showing
intensive irregular joint patterns.
86-NCROS-002

WHITE LAKE FELSIC INTRUSION

LOCATION: EAST-CENTRAL OLDEN AND WEST-CENTRAL OSO TOWNSHIP; NORTH OF SHARBOT LAKE
NTS 31C/15   OGS MAP #2471
GEOLOGICAL REPORT #228

SAMPLE SITES: 86-OSO-004, 86-OLD-001, 86-OLD-002

DESCRIPTION OF AREA:

Wolff (1985) describes the intrusion as late-stage granitic rocks intruding clastic and carbonate metasediments. The granitic rocks include biotite granite, quartz monzonite, granodiorite, syenite, and porphyritic varieties of the preceding units. They are similar in composition and structural setting to the McLean Granite and may be a northeasterly extension of this intrusion.

Outcrops at the sample sites exhibit irregular, intense jointing and other deleterious features such as pegmatite dikes, pyrite, and magnetite.

CONCLUSIONS:

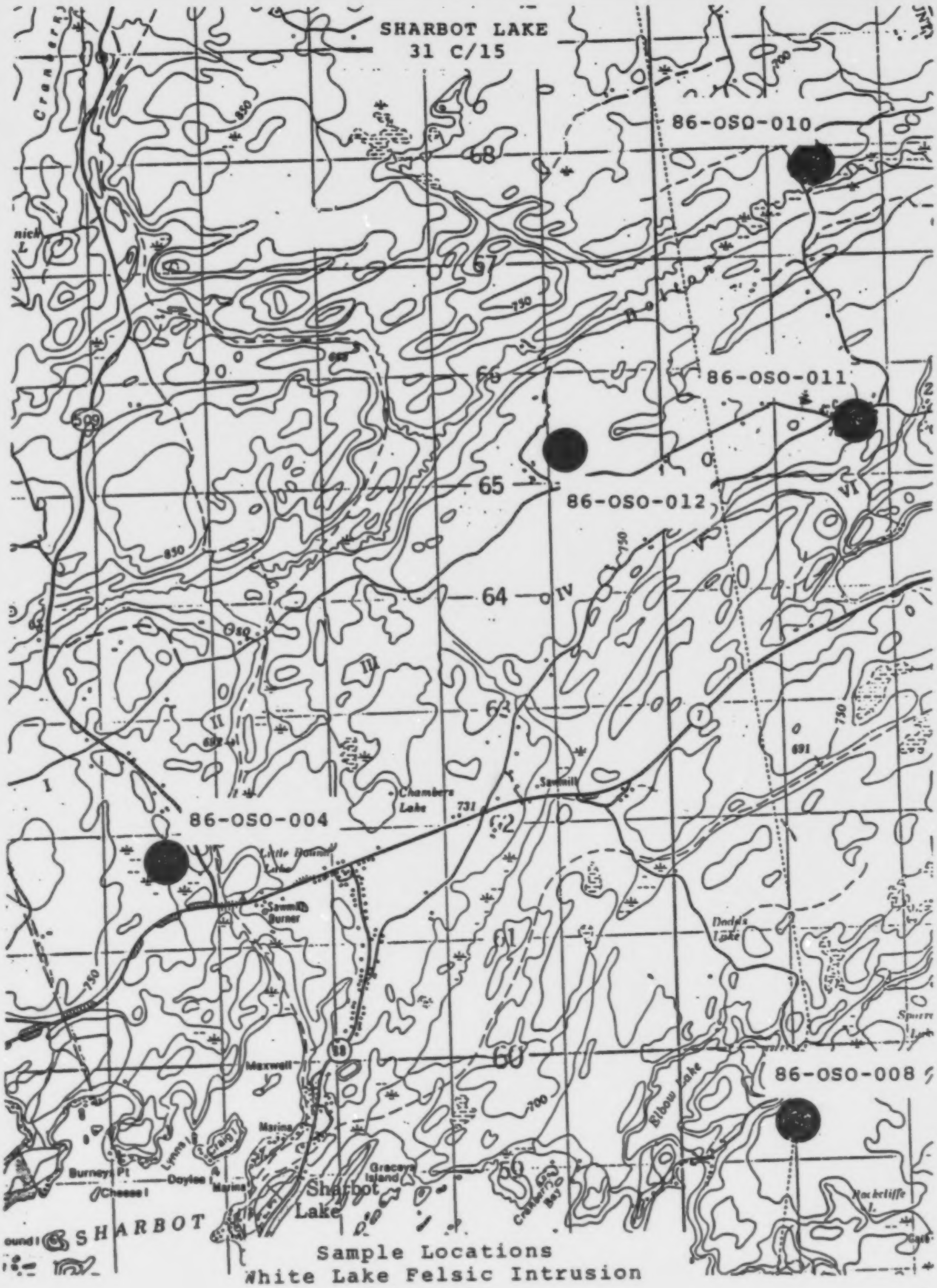
The White lake Felsic Intrusion has low potential as a building stone prospect.

POTENTIAL

POOR	MODERATE	GOOD
86-OSO-004 86-OLD-001 86-OLD-002		

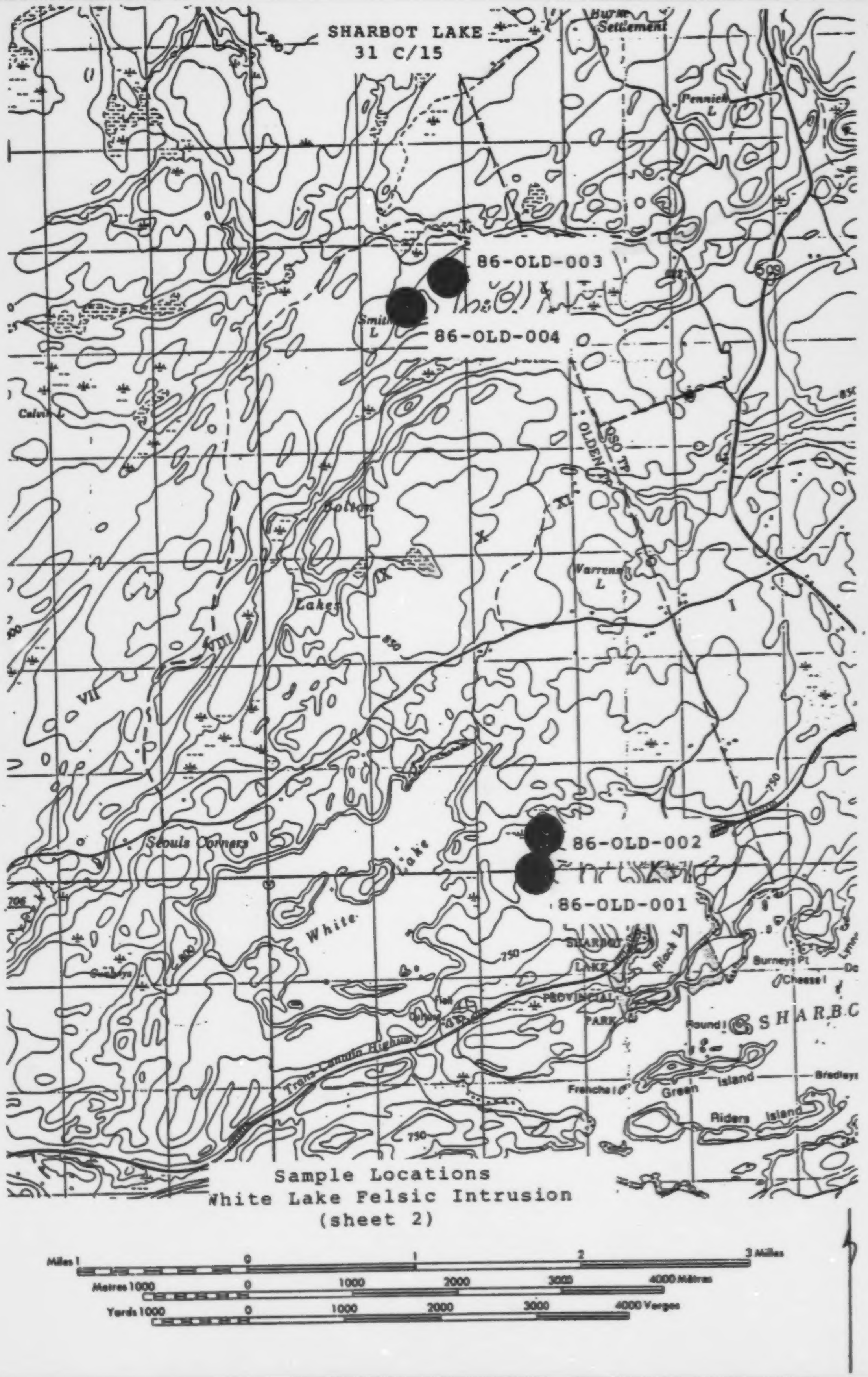
REFERENCES

Wolff, J.M.
1985: Geology of the Sharbot Lake Area, Frontenac and Lanark Counties, Southeastern Ontario; Ontario Geological Survey Report 228, 70p. Accompanied by Map 2471, scale 1:31 680 or 1 inch to 1/2 mile.


SHARBOT LAKE
31 C/15
86-OSO-010
86-OSO-011
86-OSO-012
86-OSO-004
86-OSO-008
68
67
66
65
64
63
62
61
60
59
850
750
700
509
38
7
I
II
III
IV
V
VI
Chambers Lake
731
Sawmill
Little Round Lake
Sawmill Burner
Dodds Lake
Elbow Lake
Maxwell
Marina
Burneys Pt
Cheese I
Doyles I
Graceys Island
Sharbot Lake
Cranberry Bay
Rockcliffe L.
SHARBOT

Sample Locations
White Lake Felsic Intrusion
(sheet 1)

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N


SHARBOT LAKE
31 C/15
Burke Settlement
Pennick L
86-OLD-003
86-OLD-004
Smith L
509
850
Calvin L
OLDEN TP
OSO TP
Bolton
Lakes
Warrens L
VII
VIII
IX
X
XI
I
750
86-OLD-002
86-OLD-001
Seouls Corners
White Lake
SHARBOT LAKE
PROVINCIAL PARK
Black L
Burneys Pt
Cheese I
Round I
S H A R B C
French I
Green Island
Riders Island
Bradleys
Trans Canada Highway
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges

Sample Locations
White Lake Felsic Intrusion
(sheet 2)

BUILDING STONE INVENTORY

Property No. 86-OSO-004   **Pluton Name** White Lake Felsic Intrusion
Property Name Little Round Lake 1   **Commercial Stone Name** Granite
Geological Rock Name Granodiorite

Township Oso   **Lot** 18   **Con.** 1
NTS 31C/15   **UTM Co-ordinates: Easting** 365550   **Northing** 4961800
Property Status Prospect   **Air Photo No.** 78-4455-164&169
Production History Nil

Use of Explosives: Yes   **No** X   **Type**
Colour: Fresh Surface Pink-brown
Weathered Surface Light pink
Uniform   **Variable** X
Weathering Depth: 4 mm
Grain Size: Medium   **Uniform**   **Variable** X
Texture: Massive (slight foliation)   **Uniform** X   **Variable**
Fabric: Yes X   **No. Weak** X   **Mod. Strong Strike** 75 degrees **Dip**
Formed By Foliation alignment of hornblende
Bedding: Yes   **No** X   **Strike**   **Dip**   **Avg. Thickness**
Jointing: Regular Pattern X   **Irregular Pattern** X
Limited Jointing   **Moderate Jointing**   **Intensive Jointing** X
A) Strike 25 degrees **Dip** Vertical **Spacing** 2-5 m
B) Strike 100 degrees **Dip** Vertical **Spacing** .5-4 m
C) Strike   **Dip**   **Spacing**
D) Strike   **Dip**   **Spacing**
Potential For Quarry Blocks: Poor
Mineralogy: Feldspar, quartz, amphibole, biotite (epidote)

Deleterious Minerals: **Yes** X **No** **Type** Magnetite **Percent** 20%

Other Features: Pegmatite dikes, aplite dikes. 5 cm stringers of amphibole.

Possible Uses: Curbing stone, ashlar, crushed stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This rock is a medium grained, pinkish brown granodiorite. It is cut by pegmatite and aplite dikes, and stringers of amphibole. The jointing occurs in closely spaced, regular and irregular joint patterns. These factors detract from the building stone potential of this site.

Light pink granodiorite showing
good outcrop exposure.
86-OSO-004

BUILDING STONE INVENTORY

Property No. 86-OLD-001 **Pluton Name** White Lake Felsic Intrusion

Property Name White Lake I **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Olden **Lot** 17 **Con.** 9

NTS 31C/15 **UTM Co-ordinates: Easting** 362500 **Northing** 4960000

Property Status Prospect **Air Photo No.** 78-4454-163&211

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pink

Weathered Surface Rusty pink

Uniform X **Variable**

Weathering Depth: > 1 cm up to 10 cm thick (very friable)

Grain Size: Medium to coarse **Uniform** X **Variable** (X)

Texture: Foliated **Uniform** X **Variable**

Fabric: **Yes** **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Visible foliation planes

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** (X) **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 360 degrees **Dip** 70 degrees E **Spacing** 0.1 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz

Deleterious Minerals: Yes X **No Type** Sulfides and/or hematite **Percent** Trace

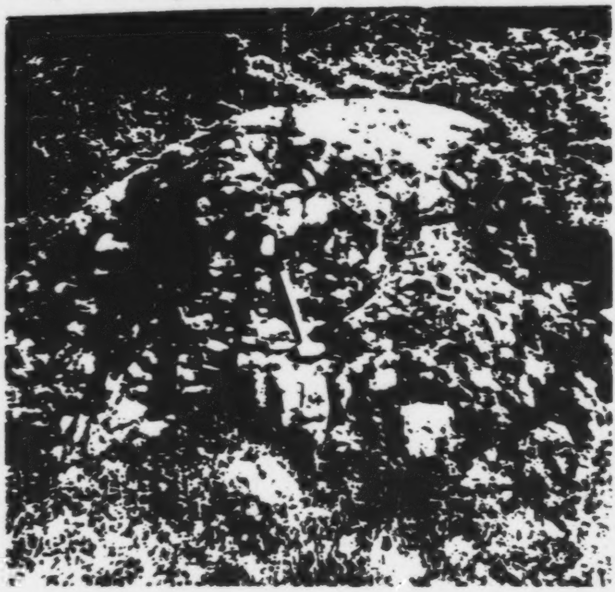
Other Features: Occasional hematite coated fractures; rusted out, disseminated sulfides; rare granitic stringers and quartz veins; rubbly weathering and poor exposure.

Possible Uses: Rubble

Outcrop Exposure: Good Fair Poor X

Comments: This outcrop is a well-foliated, deeply weathered, pink granite. The weathering depth is greater than 10 cm. Weathered areas and foliation planes are often rust coloured. The outcrop also contains intense irregular jointing. These factors limit the building stone potential of this area.

Overall view depicting poor outcrop exposure. 86-OLD-001



Rubbly weathering of rusty pink pink granite. 86-OLD-001

BUILDING STONE INVENTORY

Property No. 86-OLD-002 Pluton Name White Lake Felsic Intrusion

Property Name White Lake 2 Commercial Stone Name Granite

Geological Rock Name Granite

Township Olden Lot 17 Con. 9

NTS 31C/5 UTM Co-ordinates: Easting 362600 Northing 4960300

Property Status Prospect Air Photo No. 78-4454-163-211

Production History Nil

Use of Explosives: Yes No X Type

Colour: Fresh Surface Pinkish brown

Weathered Surface Pink

Uniform X Variable

Weathering Depth: 2 mm

Grain Size: Medium Uniform X Variable

Texture: Massive Uniform X Variable

Fabric: Yes No. X Weak Mod. Strong Strike Dip

Formed By

Bedding: Yes No X Strike Dip Avg. Thickness

Jointing: Regular Pattern Irregular Pattern X

Limited Jointing Moderate Jointing Intensive Jointing X

A) Strike Dip Spacing

B) Strike Dip Spacing

C) Strike Dip Spacing

D) Strike Dip Spacing

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole

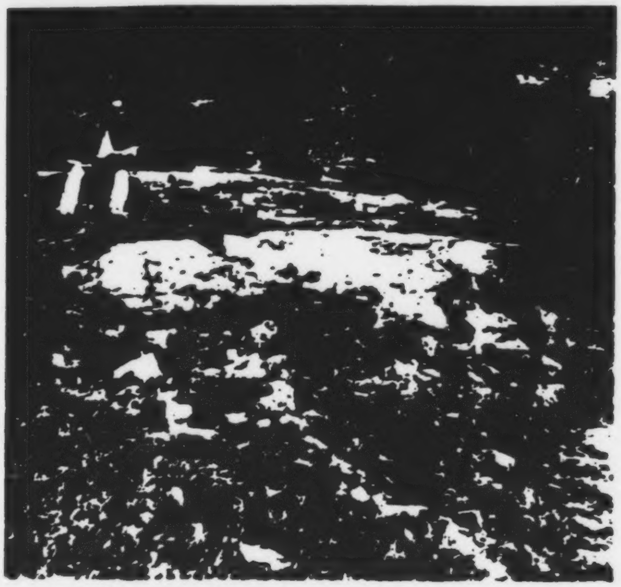
Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** Trace

Other Features: Intense weathering, intensely jointed

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: Good Fair Poor X

Comments: This massive, medium grained granite is intensely jointed and weathered. For these reasons, building stone potential is limited.



Well-weathered, poorly exposed, pink granite. 86-OLD-002

WOLFE LAKE PLUTON

LOCATION: NORTH CROSBY TOWNSHIP, NE OF WOLFE LAKE, WEST OF HIGHWAY 42 AND SOUTH OF MASH MEADOWS
NTS 31C/9 OGS MAP 2054

SAMPLE SITES: 86-NCROS-003, 86-NCROS-004

DESCRIPTION OF AREA

The Wolfe Lake Pluton consists of a highly foliated pink granite and pegmatite dikes. Several sites which were investigated turned out to be large pegmatitic ridges with limited granite exposure. Sample 86-NCROS-003 was taken very close to the centre of the pluton and showed intense irregular jointing, as did 86-NCROS-004. The intense jointing and variable colour and grain size indicate that the Wolfe Lake Pluton has very little potential for building stone applications.

POTENTIAL

POOR	MODERATE	GOOD
86-NCROS-003 86-NCROS-004		

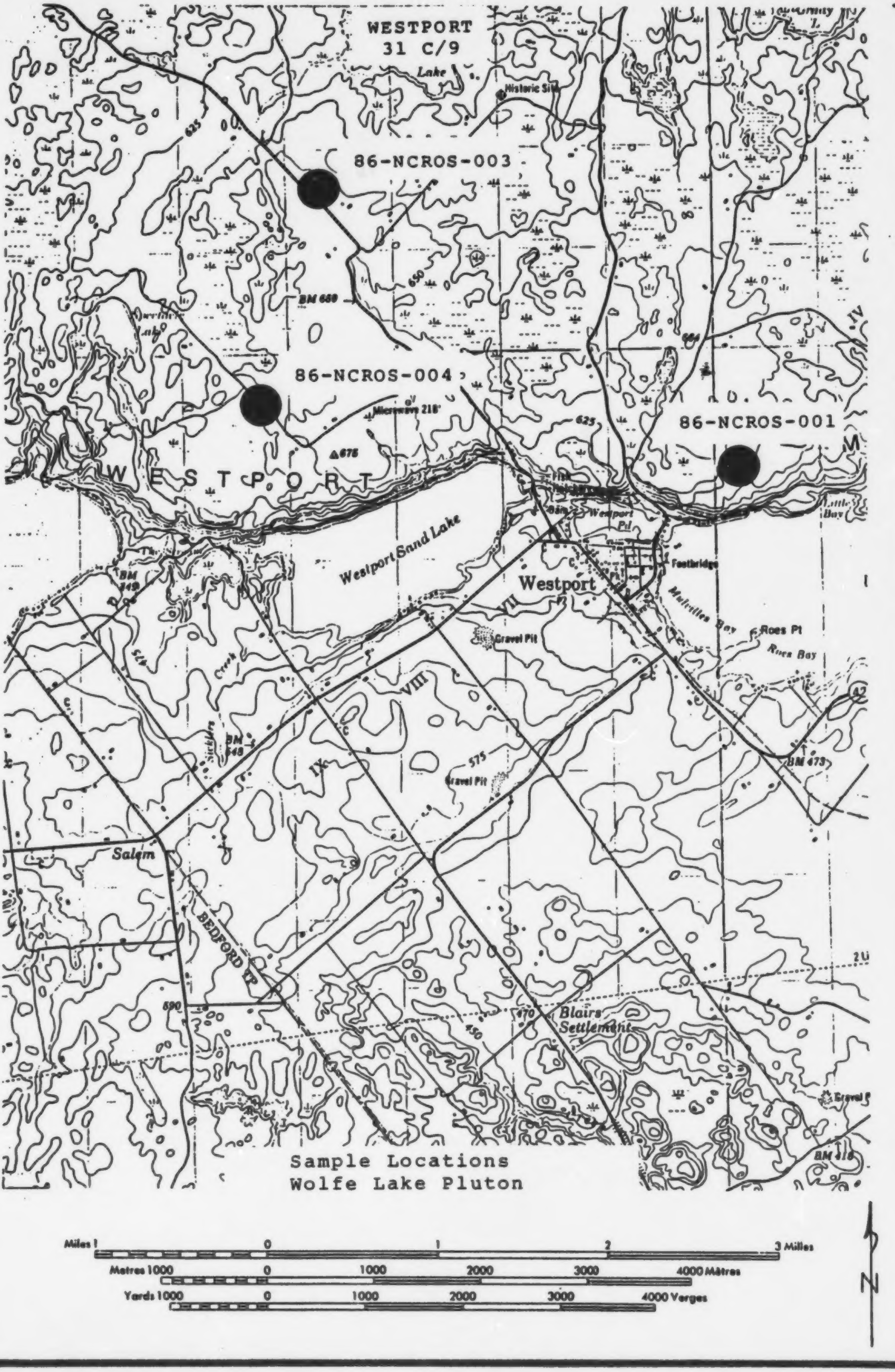
REFERENCES

Baker, M.B.
1923: Geology and Minerals of the County of Leeds, Ontario; Ontario Department of Mines, Annual Report, 1922, Volume 31, Part 6.

Davidson, A., Britton, J.M., Bell, K., and Blendinsop, J.
1979: Regional Synthesis of the Grenville Province of Ontario and Western Quebec; in Current Research, Part B, Geological Survey of Canada, Paper 79-1B, p.153-262.

Hewitt, D.F.
1964: Geological Notes for Maps Numbers 2053 & 2054, Madoc-Gananoque Area, NTS 31B/5 + 12, 31C, Ontario; Ontario Department of Mines, Geological Circular 12.

Wynne-Edwards, H.R.
1967: Westport Map-Area, Ontario; Geological Survey of Canada, Memoir 346.


WESTPORT
31 C/9
86-NCROS-003
86-NCROS-004
86-NCROS-001
Historic Site
BM 660
Microwave 218
WESTPORT
Westport Sand Lake
Westport
Westport Pt
Footbridge
Mulvilles Bay
Roes Pt
Roes Bay
Little Bay
Gravel Pit
VIII
IX
Salem
BEDFORD TP
Blairs Settlement
Gravel Pit
BM 473
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Wolfe Lake Pluton

BUILDING STONE INVENTORY

Property No. 86-NCROS-003 **Pluton Name** Wolfe Lake Pluton

Property Name Tommy Lake **Commercial Stone Name** Granite

Geological Rock Name Monzonite

Township North Crosby **Lot** 19 **Con.** 6

NTS 31C/9 **UTM Co-ordinates: Easting** 386300 **Northing** 4951650

Property Status Prospect **Air Photo No.** 78-4450-131-75

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pinkish brown

Weathered Surface Bleached pink

Uniform **Variable** X

Weathering Depth:

Grain Size: Medium grained **Uniform** **Variable** X

Texture: Foliated **Uniform** **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite (sphene)

Deleterious Minerals: **Yes** X **No** **Type** Sulphides **Percent** 1%

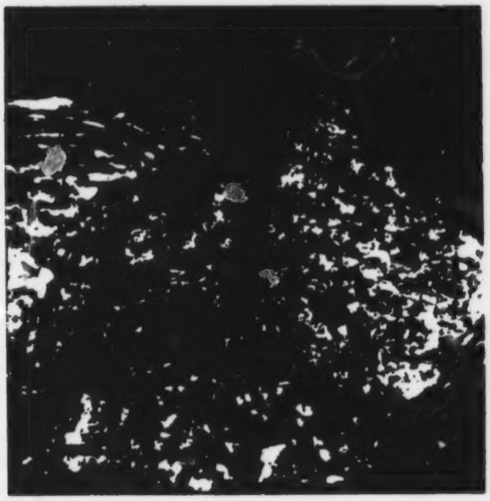
Other Features: Pegmatite masses comprise about 10% of the volume of this rock. Mafic inclusions, aplite, highly variable grain size and textures are present. Biotite comprises about 15% of this rock, locally as coarse crystals.

Possible Uses: Crushed stone, ashlar

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This site, close to the center of the Wolfe Lake Pluton, exhibits intense irregular jointing. The highly variable fabric makes this site of poor potential for building stone development. Other deleterious features include the abundance of biotite (which commonly is coarse grained), pegmatite phases and alteration of biotite.

Overall view of outcrop exhibiting irregular joint pattern.
86-NCROS-003



Textural close-up depicting coarse biotite crystals.
86-NCROS-003

BUILDING STONE INVENTORY

Property No. 86-NCROS-004 **Pluton Name** Wolfe Lake Pluton

Property Name Spectacle Lake **Commercial Stone Name** Granite

Geological Rock Name Monzonite

Township North Crosby **Lot** 16 **Con.** 8

NTS 31C/9 **UTM Co-ordinates: Easting** 385700 **Northing** 4949600

Property Status Prospect **Air Photo No.** 78-4448-88-90

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pink

Weathered Surface Pink

Uniform X **Variable**

Weathering Depth: Extensive

Grain Size: Medium **Uniform** **Variable** X

Texture: Foliated **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Alignment of biotite crystals

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, sphene; Mafic content: approx. 20-30%

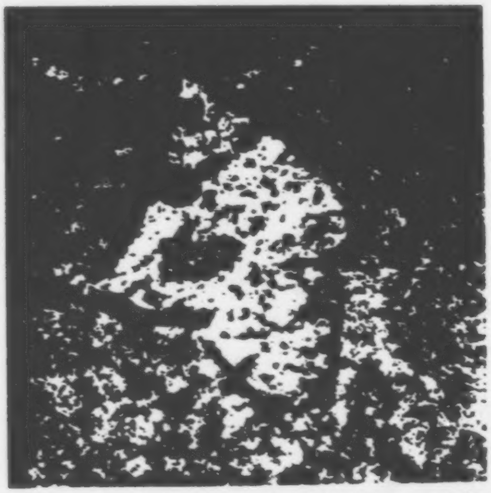
Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Biotite knots, mafic inclusions, pegmatite phases, siliceous inclusions

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a medium grained, moderately foliated, bleached, pink monzonite. Medium grained sphene crystals comprise about 2-30% of this rock. The most obvious feature at this site is the extensive weathering, which has produced an incompetent, bleached surface layer. Intense irregular jointing limits the building stone potential for this area.



Textural close-up showing grain size and mafic inclusions.
86-NCROS-004

WOLLASTON GRANITE

LOCATION: WOLLASTON TWP, NORTH OF HIGHWAY 620, 5 KM WEST OF COE HILL
NTS 31C/13 OGS MAP 2020
GEOLOGIC REPORT #11

SAMPLE SITES: 86-WOL-002, 86-WOL-003, 86-WOL-011

DESCRIPTION OF THE AREA

The Wollaston Granite is characterized by pink biotite granite to the north and south and grey, gneissic, biotite granite in the center. One site was visited in the southern part of the pluton and was recognized as a pink biotite granite with a definite foliation striking toward the north and dipping east. Another site, just south of Cranberry Lake, was seen to be slightly more fine grained and more strongly foliated, almost gneissic. The weathering depth at both of these sites does not appear to be a negative factor.

All areas showed regular and irregular jointing patterns ranging from moderate to intense. The true intensity of the jointing at 86-WOL-002 is difficult to determine because it is a roadcut.

Mineralogy is mainly quartz, potassium feldspar, plagioclase and biotite.

In the north and south parts of the pluton, quartz pods and stringers were noticed, as well as biotite seams and hematite staining. These features appeared to be absent toward the center of the pluton. No other deleterious minerals were noticed.

Outcrop exposure in the areas visited is fair.

CONCLUSIONS

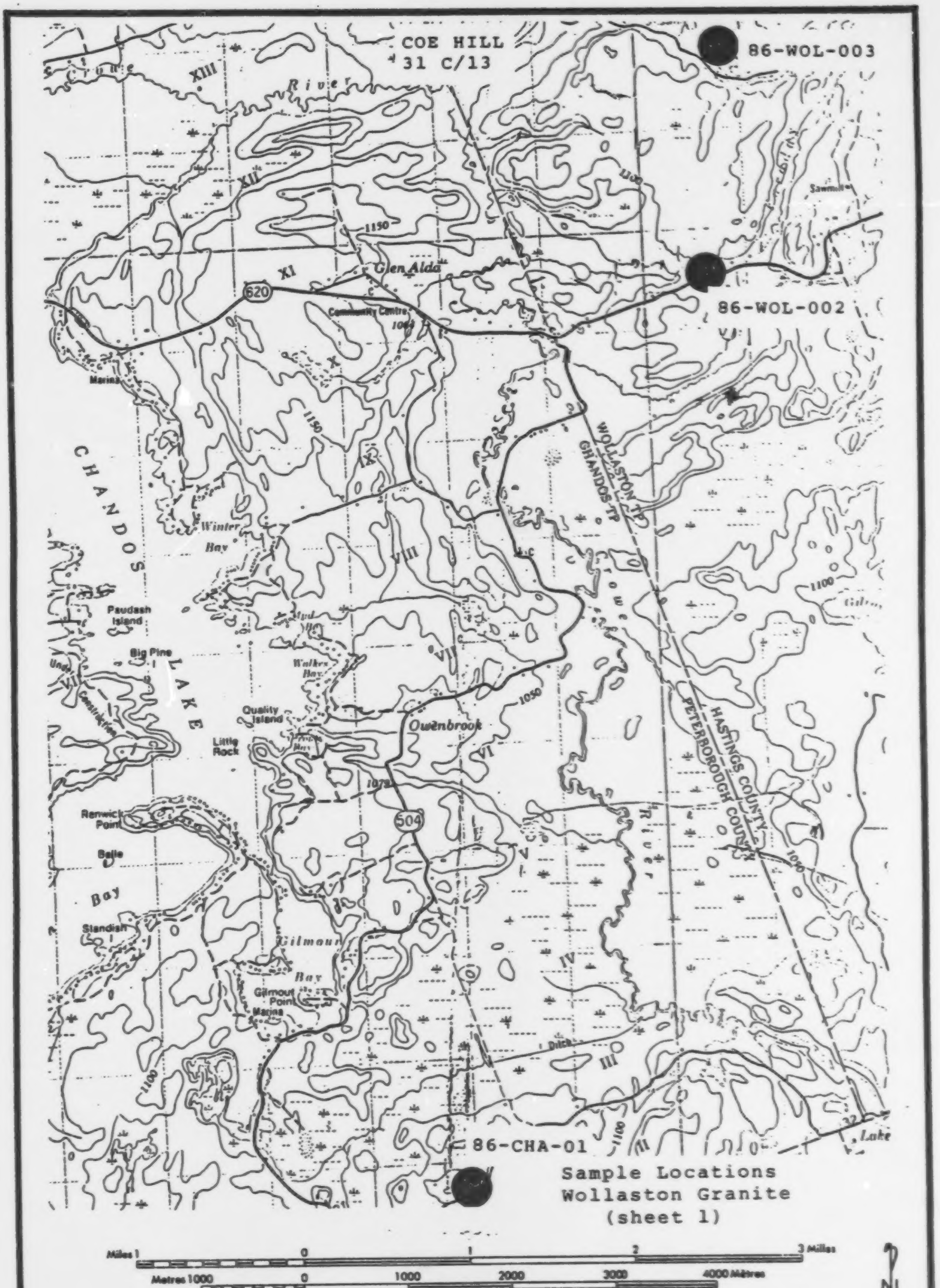
The Wollaston Granite shows little potential for building stone purposes. Potential quarry size is small and texture over large areas is inconsistent. The center of the pluton shows more promise than the southern and the northern parts for further investigation.

POTENTIAL

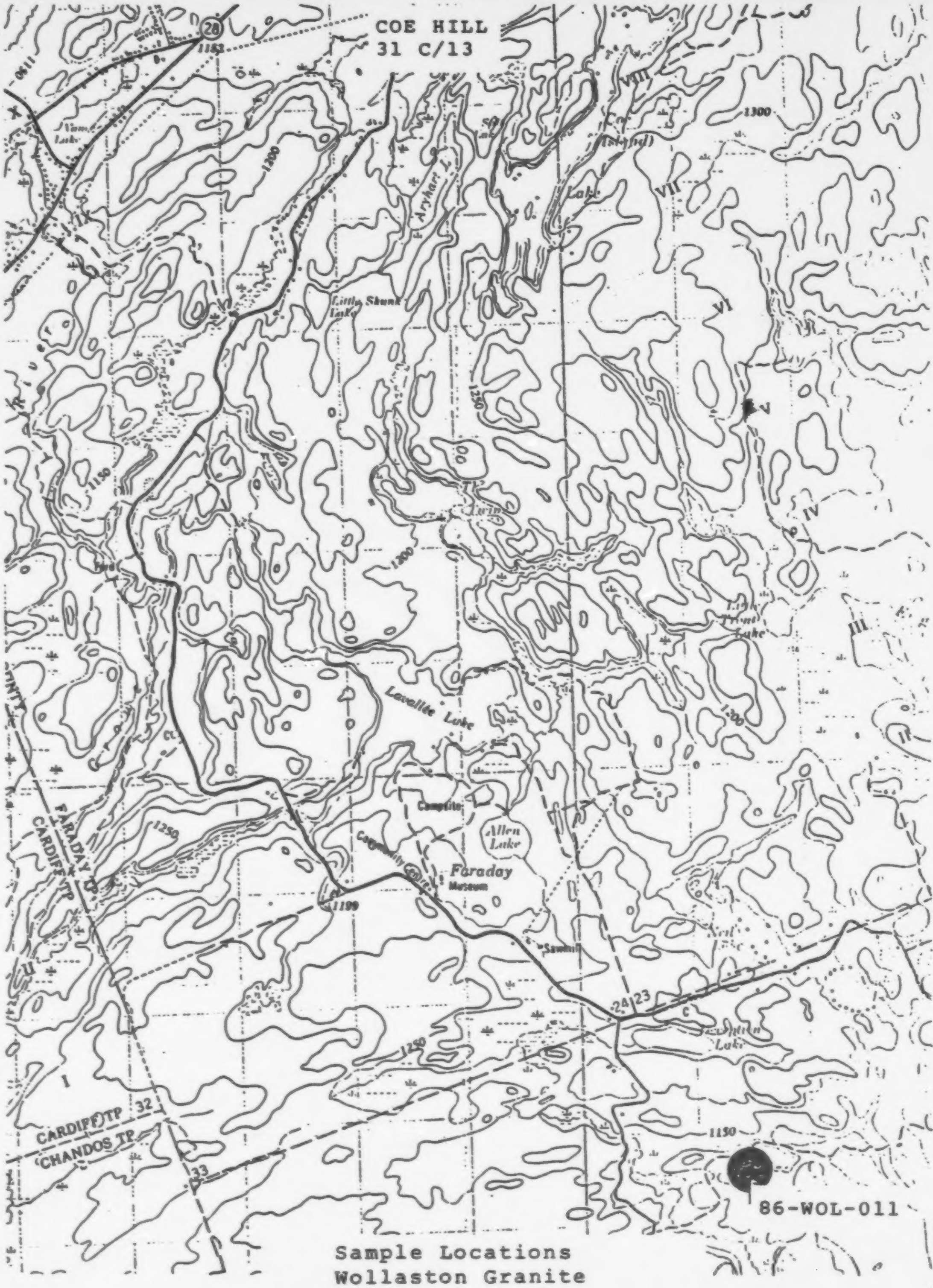
POOR	MODERATE	GOOD
86-WOL-002		
86-WOL-003		
86-WOL-011		

REFERENCES

Hewitt, D.F.
1962: Geology of Wollaston Township, Hastings County, Ontario; Ontario Department of Mines, Geological Report 11, p.29-55.


COE HILL
31 C/13
86-WOL-003
86-WOL-002
86-CHA-01
Crowe River
XIII
XII
XI
X
IX
VIII
VII
VI
V
IV
III
II
620
504
Glen Alda
Community Centre
Marina
CHANDOS
LAKE
Winter Bay
Paudash Island
Big Pine
Quality Island
Little Rock
Walkers Bay
Owenbrook
Renwick Point
Belle Bay
Standish
Gilmour Bay
Gilmour Point
Marina
WOLLASTON TP
CHANDOS TP
HASTINGS COUNTY
PETERBOROUGH COUNTY
Sawmill
Lake
1150
1100
1050
Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Wollaston Granite
(sheet 1)


COE HILL
31 C/13
28
1183
1200
1300
1250
1150
1130
1199
Aryhart L.
Lake
Little Skunk Lake
Twin
Lavallee Lake
Campsite
Allen Lake
Faraday
Museum
Sawmill
Allen Lake
FARADAY TP
CARDIFF TP
CARDIFF TP 32
CHANDOS TP
33
24
23
X
IX
VIII
VII
VI
V
IV
III
II
I
86-WOL-011

Sample Locations
Wollaston Granite
(sheet 2)

Miles 1 0 1 2 3 Miles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-WOL-002

Pluton Name Wollastonite Granite

Property Name Coe Hill

Commercial Stone Name Granite

Geological Rock Name Granite

Township Wollaston

Lot 28, 29 **Con.** 8

NTS 31C/13 **UTM Co-ordinates: Easting** 370600 **Northing** 4969550

Property Status Prospect

Air Photo No. 77-4435-74-216

Production History Nil

Use of Explosives: Yes X **No** **Type** Roadcut

Colour: Fresh Surface Pink

Weathered Surface Light pink

Uniform X **Variable**

Weathering Depth: Extensive

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** **Variable** X

Fabric: Yes X **No. Weak Mod.** X **Strong Strike** 20 degrees **Dip** E

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike 100 degrees **Dip** Vertical **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Extensive hematite staining, bioite seams, quartz pods, quartz stringers.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This outcrop displays a strong degree of foliation which becomes gneissic in places. Many of the fractures in this rock are hematite stained. Irregular structures such as quartz veins and biotite seams limit the potential of this area for building stone development. The use of explosives at this site prohibits joint interpretation.

Fair outcrop exposure showing intensive jointing. 86-WOL-002

BUILDING STONE INVENTORY

Property No. 86-WOL-003 **Pluton Name** Wollastonite Granite

Property Name Cranberry Lake **Commercial Stone Name** Granite

Geological Rock Name Granite to granite gneiss

Township Wollaston **Lot** 25,26 **Con.** 10

NTS 31C/13 **UTM Co-ordinates: Easting** 370800 **Northing** 4971900

Property Status Prospect **Air Photo No.** 77-4436-17-45

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Pink-black

Weathered Surface Whitish-grey

Uniform X **Variable**

Weathering Depth: 1 mm

Grain Size: Fine to medium **Uniform** X **Variable**

Texture: Foliated to gneissic **Uniform** **Variable** X

Fabric: **Yes** X **No.** **Weak** **Mod.** **Strong** X **Strike** 0 degrees **Dip** 65 degrees E

Formed By Alignment of biotite crystals

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 100 degrees **Dip** Vertical **Spacing** ≤ 1 m
B) Strike 150 degrees **Dip** 60 degrees W **Spacing**
C) Strike **Dip** **Spacing**
D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: K-spar, quartz, biotite plagioclase

Deleterious Minerals: Yes No X **Type** **Percent**

Other Features:

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: Good Fair X Poor

Comments: The inconsistent texture and irregular jointing at this site indicate low building stone potential.

View showing horizontal and vertical jointing. 86-WOL-003

BUILDING STONE INVENTORY

Property No. 86-WOL-011 **Pluton Name** Wollaston Granite

Property Name Rabbit Hill **Commercial Stone Name** Granite

Geological Rock Name Biotite Granite Gneiss

Township Wollaston **Lot** 21 **Con.** 15

NTS 31C/13 **UTM Co-ordinates: Easting** 271450 **Northing** 4976400

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Dull pink

Weathered Surface Light pink

Uniform **Variable** X

Weathering Depth: 1 to 1.5 cm

Grain Size: Medium grained **Uniform** X **Variable**

Texture: Gneissic **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod.** X **Strong Strike** 88 degrees **Dip** Vertical

Formed By Alignment of biotite crystals

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, biotite, quartz

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz veins and pods, hematite staining (especially around the mafic grains); intense exfoliation; felsic component is an unattractive bleached colour.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This site is located near the northern margin of the Wollaston Granite. The rock here has a dull or bleached colour. Its appearance is further degraded by hematite staining. Intense, irregular jointing limits the building stone potential in this area.

Fair outcrop exposure along with intensive jointing was noted at this property. 86-WOL-011

WOLLASTON LAKE GABBRO

LOCATION: SOUTH PART OF WOLLASTON TOWNSHIP, SOUTH OF WOLLASTON LAKE
NTS 31C/13 OGS MAP #2020
GEOLOGICAL REPORT #11

SAMPLE SITES: 86-WOL-013

DESCRIPTION OF AREA:

The intrusion is described by Hewitt (1962, p.41) as follows:

"The Wollaston Lake gabbro is an elongate body 6 km long and up to 1.5 km wide, extending from Wollaston Lake to Castoroil Lake in south-central Wollaston township. Inclusions of gabbro and diorite in the Coe Hill granite indicate that this gabbro body probably extended at least 2 miles farther to the southwest, before the intrusion of the Coe Hill granite.

The body consists of biotitic gabbro, diorite, and metagabbro. The gabbro is medium to coarse grained and consists predominantly of augite and plagioclase, with hornblende, biotite, apatite, and magnetite as accessories. Biotite may occur in porphyroblasts up to 1 inch in diameter."

Sample site 86-WOL-013 shows an intense, irregular joint pattern with numerous quartz and mafic stringers.

CONCLUSIONS

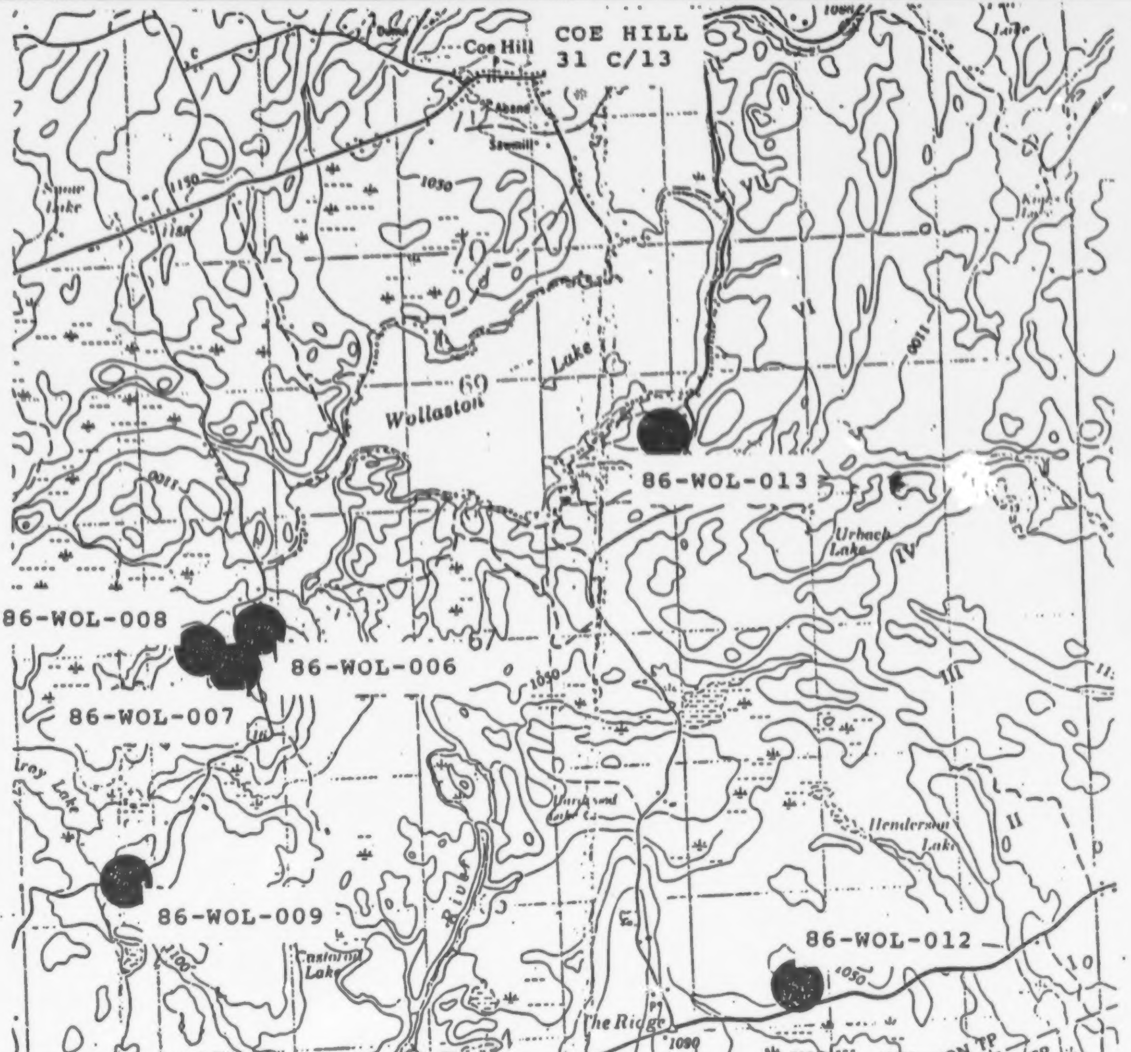
The Wollaston Lake gabbro has little building stone potential.

POTENTIAL

POOR	MODERATE	GOOD
86-WOL-013		

REFERENCES

Hewitt, D.F.
1962: Geology of Wollaston Township; p.29-55 in ODM Geol. Rept. #11 (accompanied by Map 2020).


COE HILL
31 C/13
Coe Hill
Wollaston Lake
86-WOL-013
86-WOL-008
86-WOL-006
86-WOL-007
86-WOL-009
86-WOL-012
86-WOL-010
Urbach Lake
Henderson Lake
Deer River
The Ridge
Steen Lake
Creek
WOLLASTON TP
MARMORA AND LAKE TP
LAKE GEOGRAPHIC TP
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Wollaston Lake Gabbro

BUILDING STONE INVENTORY

Property No. 86-WOL-013 **Pluton Name** Wollaston Lake Gabbro

Property Name Wollaston Lake **Commercial Stone Name** Gabbro

Geological Rock Name Gabbro

Township Wollaston **Lot** 16 **Con.** 5

NTS 31C/13 **UTM Co-ordinates: Easting** 276900 **Northing** 4968500

Property Status Prospect **Air Photo No.** 77-4435-74-220

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Salt and pepper

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: Minimal

Grain Size: Medium **Uniform** **Variable** X

Texture: Massive **Uniform** **Variable** X

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Plagioclase, amphibole; **Mafic content:** approx. 60%

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

Other Features: Quartz stringers and veins (5 mm to 2 cm width and numerous). One aplite dike 10 cm width. Mafic stringers very competent.

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This outcrop is part of the Wollaston Lake Gabbro. The rock is medium grained, massive and has the typical "salt and pepper" appearance. The mafics comprise over 60% of the rock, hence, the colour is quite dark. The numerous quartz and mafic stringers as well as the intense irregular jointing limit the potential for building stone development at this site. The grain size is variable at the outcrop scale.

BUILDING STONE INVENTORY

Property No. 86-CHA-001 **Pluton Name**

Property Name Laswade 1 mile E. **Commercial Stone Name** Granite

Geological Rock Name Red Granite

Township Chandos **Lot** 24 **Con.** 2

NTS 31C/13 **UTM Co-ordinates: Easting** 267900 **Northing** 4960800

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Pink

Weathered Surface Grey pink

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Fine to medium **Uniform** X **Variable**

Texture: Massive to slightly foliated **Uniform** **Variable** X

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Biotite, K-spar, quartz

Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

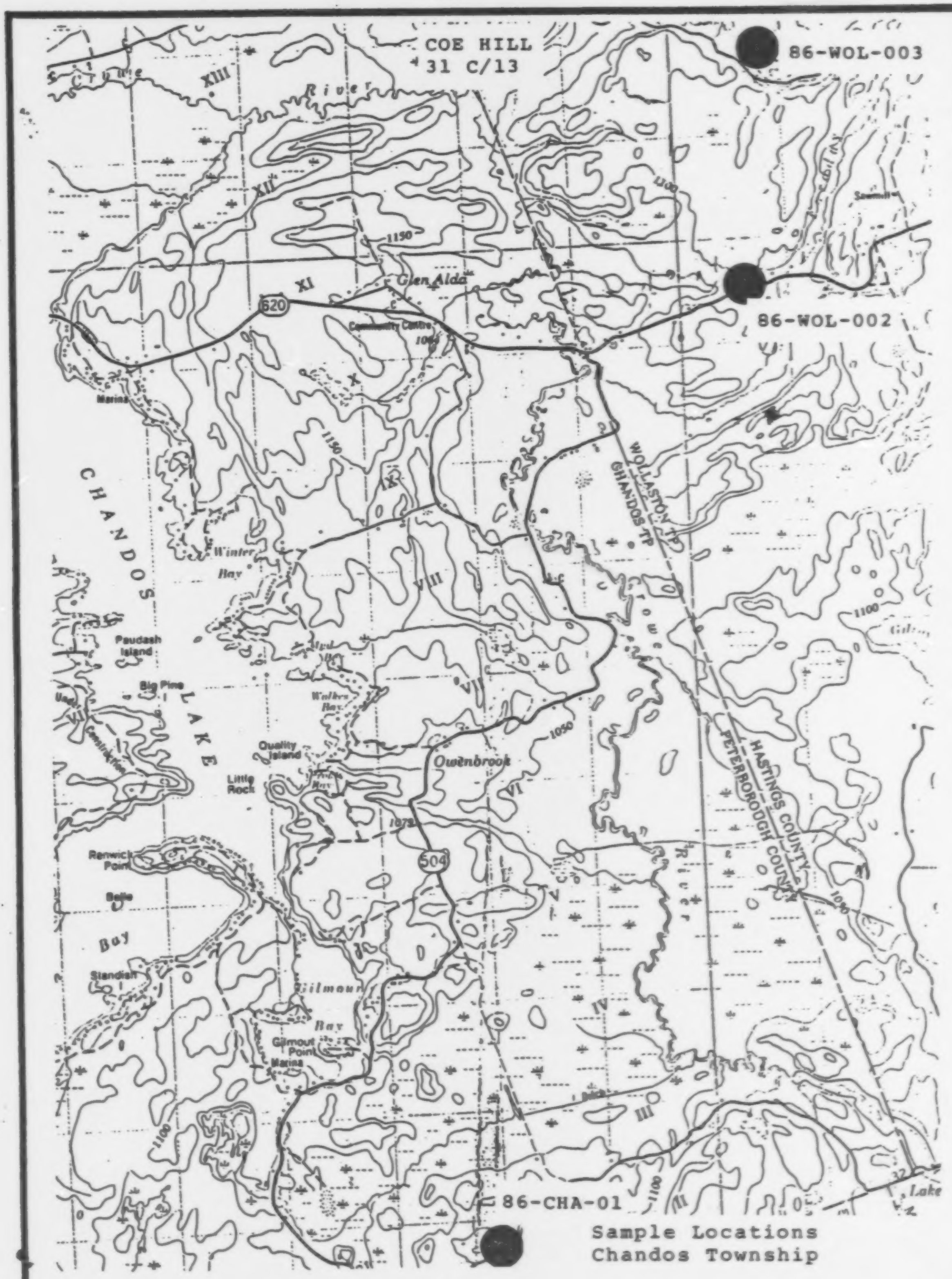
Other Features: Severe horizontal jointing, abundant quartz stringers

Possible Uses: Ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **X** **Poor**

Comments: The granite found on this property appears to have little potential for building stone applications mainly due to severe horizontal jointing and abundant quartz stringers. The rock itself is massive to slightly foliated and medium to fine grained.

View showing horizontal jointing
and limited outcrop exposure.
86-CHA-001


COE HILL
31 C/13
86-WOL-003
86-WOL-002
86-CHA-01
Crowe River
XIII
XII
XI
X
IX
VIII
VII
VI
V
IV
III
II
620
504
1150
1100
1075
1050
Glen Alda
Community Centre
Sawmill
Marina
CHANDOS LAKE
Winter Bay
Paudash Island
Big Pine
Walker Bay
Quality Island
Little Rock
Owenbrook
Renwick Point
Belle Bay
Standish
Gilmour Bay
Gilmour Point
Marina
WOLLASTON TP
CHANDOS TP
HASTINGS COUNTY
PETERBOROUGH COUNTY
Crowe River
Lake
Miles 1 0 1 2
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

Sample Locations
Chandos Township

BUILDING STONE INVENTORY

Property No. 86-HUN-001 **Pluton Name**

Property Name Moira Lake South **Commercial Stone Name** Granite

Geological Rock Name Granite

Township Hungerford **Lot** 12 **Con.** 12

NTS 31C/6 **UTM Co-ordinates: Easting** 304500 **Northing** 4926500

Property Status Prospect **Air Photo No.** 78-4433-139-128

Production History Nil

Use of Explosives: Yes **No** **Type**

Colour: Fresh Surface Pink (light)

Weathered Surface Brownish pink

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Medium grained **Uniform** X **Variable** (X)

Texture: Massive **Uniform** **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) Strike 155 degrees **Dip** Vertical **Spacing** 0.1-1.0 m

B) Strike 36 degrees **Dip** 20 NWW **Spacing** 0.1-1.0 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, amphibole, (chlorite)

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

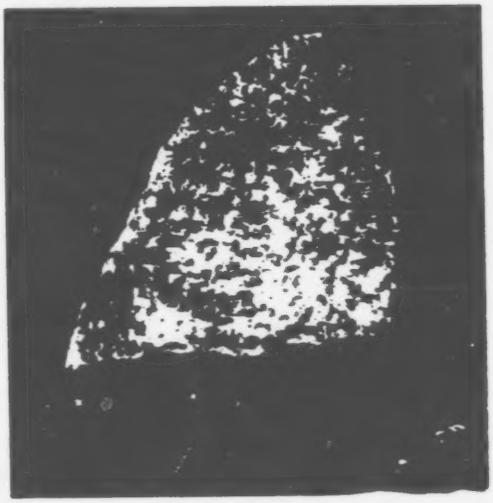
Other Features:

Possible Uses: Crushed stone, ashlar

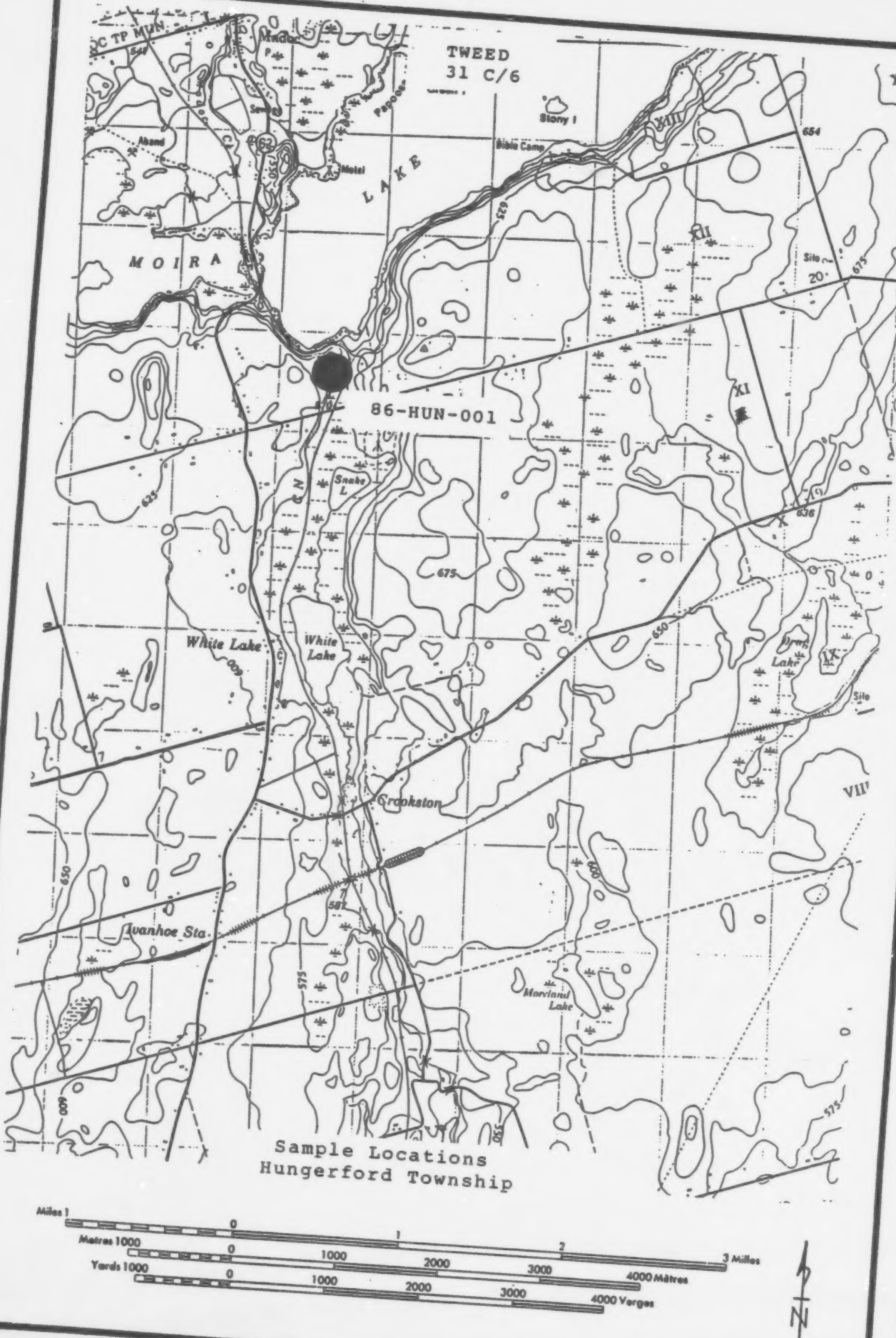
Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: The rock from the south-central shore of Moira Lake is a medium-grained granite. The intense jointing and presence of chlorite diminish the building stone potential for this area.

Overall view of outcrop area exhibiting intense jointing and fair outcrop exposure. 86-HUN-001



Little contrast between various colours. 86-HUN-001


TWEED
31 C/6
86-HUN-001
MOIRA
LAKE
Madoc
Stony I
Bible Camp
Motel
White Lake
White Lake
Snake L
Crookston
Ivanhoe Sta.
Moreland Lake
Sile
XIII
XII
XI
X
IX
VIII
625
650
675
600
575
587
654
636
Miles 1
0
1
2
3 Miles
Metres 1000
1000
2000
3000
4000 Mètres
Yards 1000
1000
2000
3000
4000 Verges
N

Sample Locations
Hungerford Township

BUILDING STONE INVENTORY

Property No. 86-LIM-001

Pluton Name Sinclair Complex

Property Name Eganccreek B.M.

Commercial Stone Name Granite

Geological Rock Name Trondhjemite

Township Limerick

Lot 23 **Con.** 15

NTS 31C/13 **UTM Co-ordinates: Easting** 384600 **Northing** 4980700

Property Status Prospect

Air Photo No. 77-4439-16-165

Production History None

Use of Explosives: Yes **No** **Type**

Colour: Fresh Surface Light grey

Weathered Surface Brown grey

Uniform X **Variable**

Weathering Depth: .3 cm

Grain Size: Fine to medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** 85 degrees **Dip** ?

Formed By Alignment of biotite

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X to **Intensive Jointing** X

A) Strike 140 degrees **Dip** vertical **Spacing** 2-3 m

B) Strike 30 degrees **Dip** vertical **Spacing** 1 m

C) Strike horizontal **Dip** 0 degrees **Spacing** .5-1.5 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Feldspar, quartz, biotite

Deleterious Minerals: Yes X **No** **Type** Biotite phenocrysts **Percent** 10%

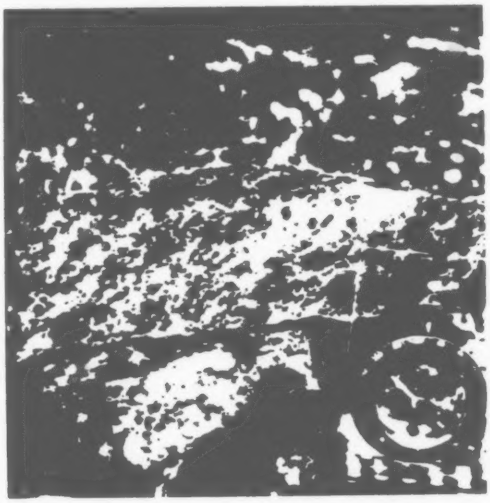
Other Features: Quartz pods, biotite knots, quartz veins, sheeting

Possible Uses: Ashlar, crushed stone

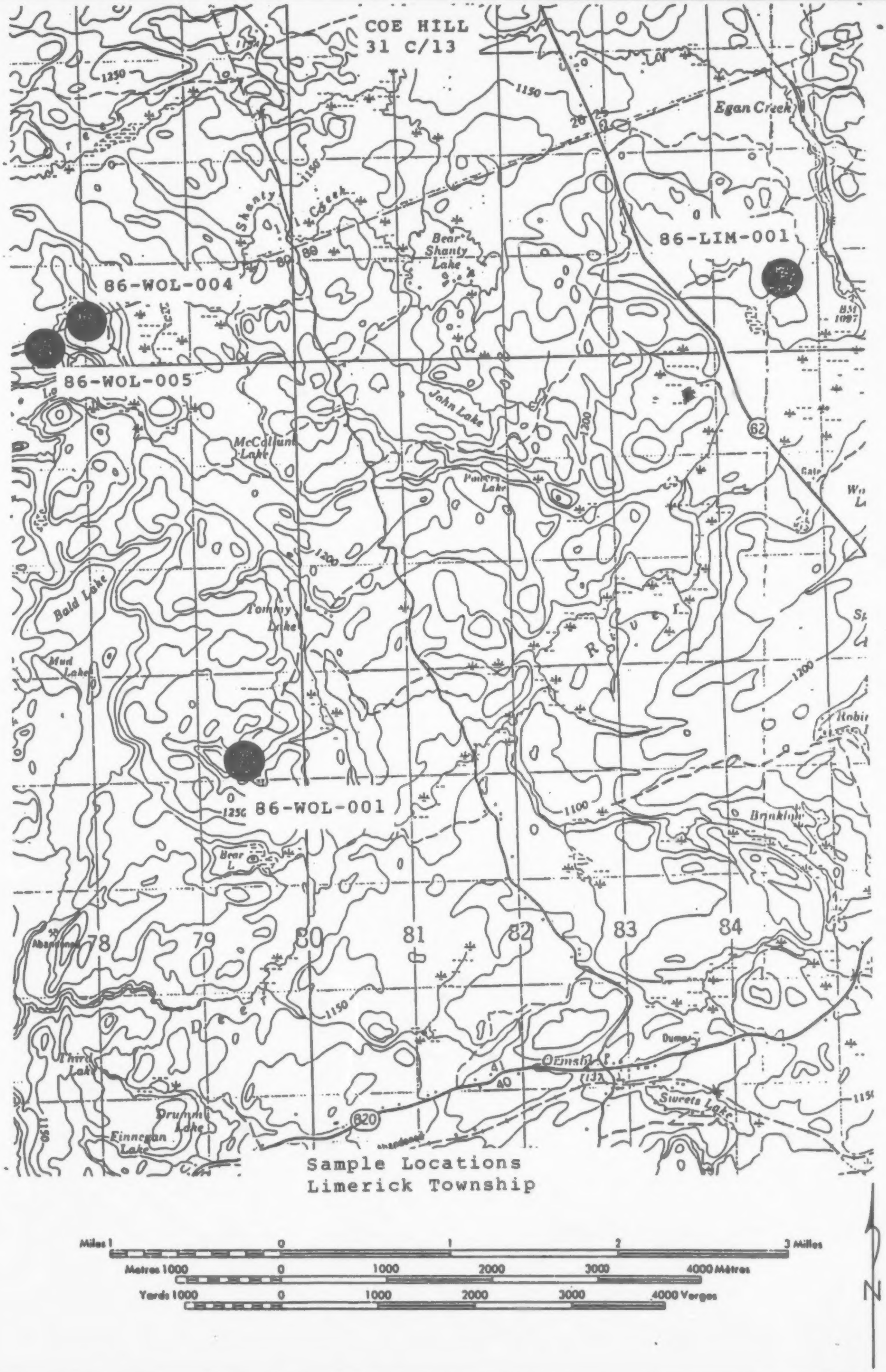
Outcrop Exposure: Good X **Fair** **Poor**

Comments: This rock is a fine to medium grained, strongly foliated grey biotite trondhjemite. The outcrop exposure is extensive. Quartz veins and pods, exfoliation planes and moderate to intensive jointing occur at this location.

Good outcrop exposure. 86-LIM-001



Light grey, fine to medium grained trondhjemite. 86-LIM-001


COE HILL
31 C/13
86-LIM-001
86-WOL-004
86-WOL-005
86-WOL-001
Egan Creek
Shanty Creek
Bear Shanty Lake
John Lake
McCollum Lake
Powers Lake
Bald Lake
Tommy Lake
Mud Lake
Bear L.
Third Lake
Drumm Lake
Finnegan Lake
Ormsby
Dumas
Sweets Lake
Brinklow
Abandoned
62
620
1150
1200
1250
1100
78
79
80
81
82
83
84
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Limerick Township

BUILDING STONE INVENTORY

Property No. 86-MAD-031 **Pluton Name**

Property Name Hwy 23 **Commercial Stone Name** Porphyry

Geological Rock Name Granite Porphyry

Township Madoc **Lot** 2 **Con.** 4

NTS 31C/12 **UTM Co-ordinates: Easting** 301200 **Northing** 4930800

Property Status Inactive-farm **Air Photo No.** 78-4435-136-124

Production History None

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Almost black with pink spots

Weathered Surface Pink-grey

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Fine grained groundmass **Uniform** X **Variable**

Texture: Porphyritic **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 65 degrees **Dip** 60 degrees S. **Spacing** .5 m

B) Strike 180 degrees **Dip** 65 degrees W. **Spacing** .5 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair-poor

Mineralogy: K-spar

Deleterious Minerals: **Yes** **No** X **Type** **Percent**

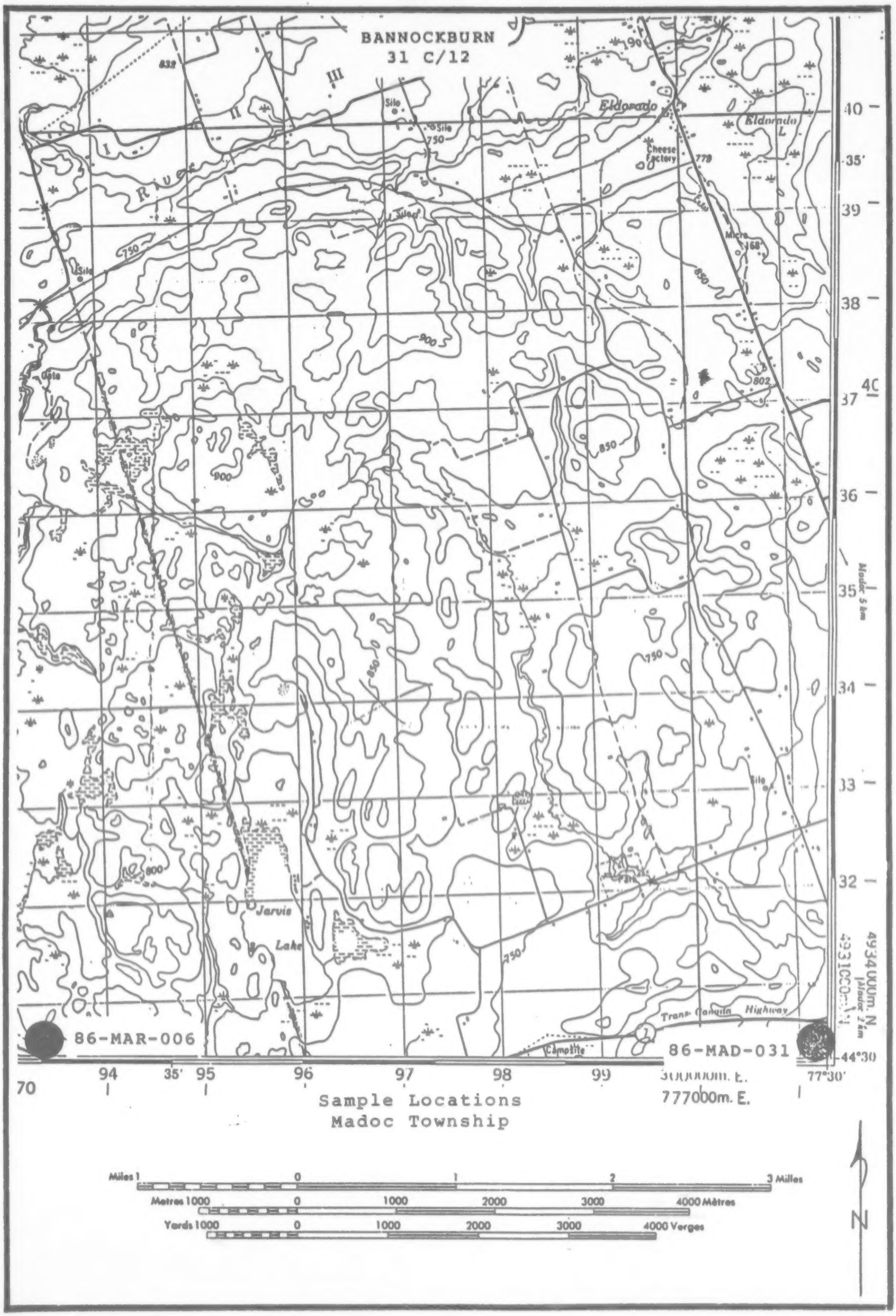
Other Features: Some quartz pods and stringers

Possible Uses: Ashlar, curbing stone, paving stone, crushed aggregate

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This outcrop displays a porphyritic andesite consisting of large potassium feldspar phenocrysts in a dark, fine grained groundmass. The outcrop appears to have irregular, moderate jointing but limited exposure prevents complete analysis of the joint pattern. Some quartz pods and stringers were noted in the area. The rock is very dark, almost black, with pink spots.

Overall view of outcrop. Note hammer for scale. 86-MAD-031


BANNOCKBURN
31 C/12
832
III
II
I
River
Sile
750
Eldorado
Eldorado L.
Cheese Factory
779
190
Micro
168
850
900
802
Gate
Silo
Jarvis
Lake
800
Park
Trans-Canada Highway
Campsite
86-MAR-006
86-MAD-031
40
35'
39
38
37
36
35
34
33
32
Madoc 5 km
4934000m. N.
4931000m. N.
Madoc 2 km
44°30
70
94
35'
95
96
97
98
99
300000m. E.
777000m. E.
77°30'
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Sample Locations
Madoc Township

BUILDING STONE INVENTORY

Property No. 86-OLD-025 **Pluton Name**

Property Name S-W of Gibbs Garage **Commercial Stone Name** Granite

Geological Rock Name Pegmatite

Township Olden **Lot** 17 **Con.** 2

NTS 31C/15 **UTM Co-ordinates: Easting** 351800 **Northing** 4957000

Property Status Prospect **Air Photo No.** 78-4453-162-129,130,131
78-4452-157-72,73,74

Production History Nil

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** Whitish-grey

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: 1 cm

Grain Size: Coarse **Uniform** X **Variable**

Texture: Pegmatitic **Uniform** X **Variable**

Fabric: **Yes** **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 60 degrees **Dip** Vertical **Spacing** 2 m

B) Strike 180 degrees **Dip** Vertical **Spacing** 3 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Good

Mineralogy: Alkali feldspar, quartz, biotite, garnet

Deleterious Minerals: Yes No X Type Percent

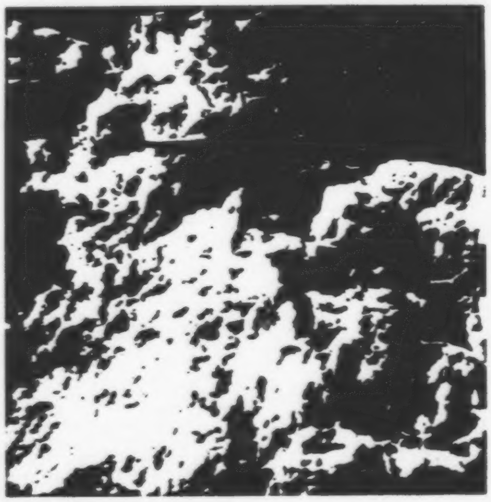
Other Features: Some quartz stringers

Possible Uses: Architectural stone, ornamental stone, structural stone

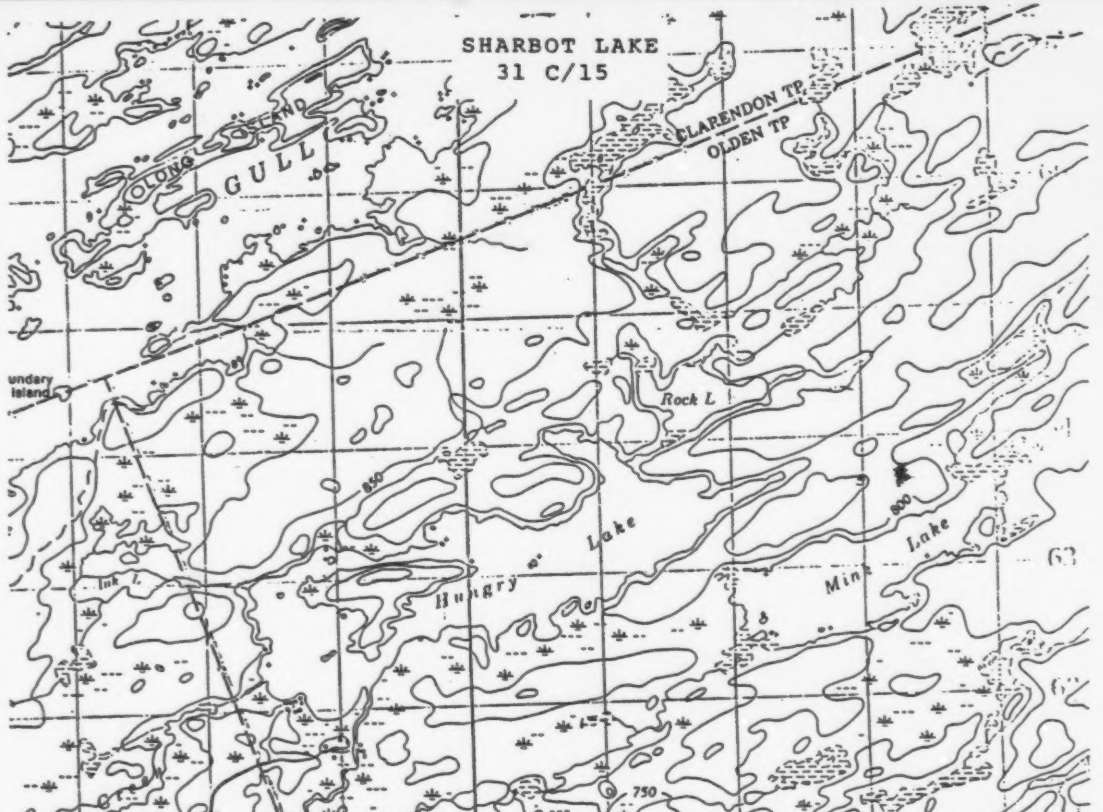
Outcrop Exposure: Good X Fair Poor

Comments: This pegmatite is very impressive in both extent and jointing pattern. The outcrop area appears quite large and jointing is very regular and moderate. The grain size is extremely coarse and consists of alkali feldspar, quartz, biotite and garnet. Grain size appears predominantly uniform, as does texture. The colour is mainly very light due to the feldspar and quartz but the garnet and biotite cause darker areas. The outcrop is generally free of deleterious features but some quartz stringers were observed. This area warrants further investigation.

Overall outcrop area. Note very limited jointing. 86-OLD-025



Close-up shows coarse grained pegmatite. 86-OLD-025


SHARBOT LAKE
31 C/15
LONG ISLAND
GULL
CLARENDON TP
OLDEN TP
undary Island
Rock L
850
800
Hungry Lake
Mink Lake
Ink L.
63
62
750
Crooked Creek
OLDEN TP
KENNEBEC TP
Long Narrow L.
Boris L.
IV
III
II
I
XI
X
Cox's Lake
700
Kennebec Lake
Sawmill
703
7
86-KEN-030
86-OLD-25
86-OLD-26
47
48 55'
49
50
51
52
Kaladar 20 km
Mountain Grove 2 km

Sample Locations
Olden Township

Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-WOL-001 **Pluton Name** Small Intrusion South of Bald and Tommy Lakes

Property Name Tommy Lake South **Commercial Stone Name** Granite

Geological Rock Name Gabbro/Anorthosite

Township Wollaston **Lot** 3 **Con.** 12

NTS 31C/13 **UTM Co-ordinates: Easting** 379550 **Northing** 4976200

Property Status Prospect **Air Photo No.** 77-4438-16-29

Production History Nil

Use of Explosives: Yes **No** X **Type**

Colour: Fresh Surface Black

Weathered Surface Light grey

Uniform X **Variable**

Weathering Depth: 1-2 mm

Grain Size: Medium to coarse **Uniform** X **Variable**

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern (X) **Irregular Pattern** (X)

Limited Jointing **Moderate Jointing** (X) **Intensive Jointing**

A) **Strike** 0 degrees **Dip** 56 degrees W **Spacing** .1-2 m

B) **Strike** **Dip** **Spacing**

C) **Strike** **Dip** **Spacing**

D) **Strike** **Dip** **Spacing**

Potential For Quarry Blocks: Fair for small blocks

Mineralogy: Feldspar, amphibole

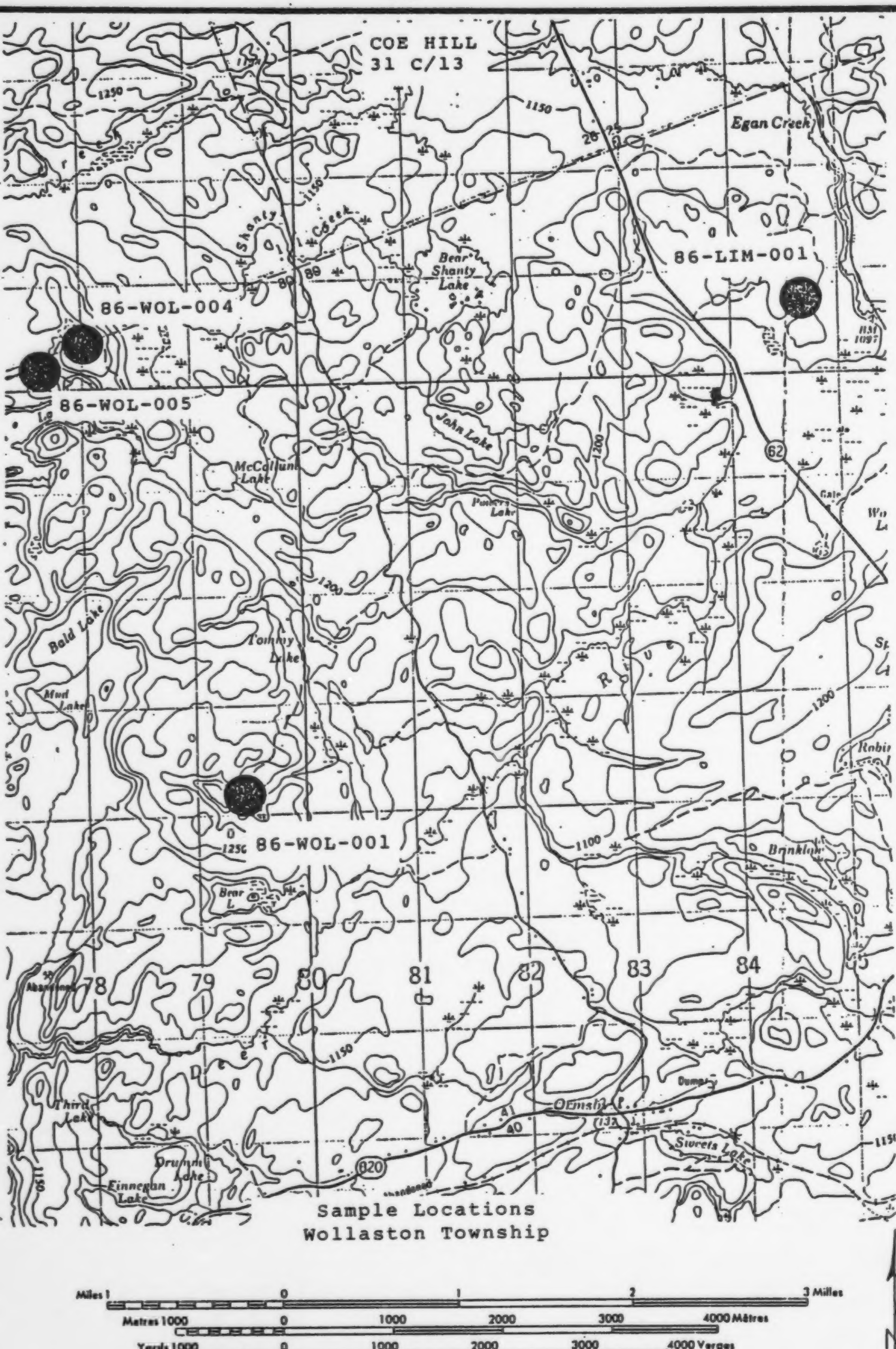
Deleterious Minerals: **Yes** **No** X **Type** **Percent** Trace

Other Features: Mafic content is variable

Possible Uses: Monumental stone, ashlar, crushed stone

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: Outcrop exposure is poor at this location, making assessment difficult. Jointing is both regular and irregular with moderate spacing. Since the stone is black in colour, further evaluation of this area is warranted.


COE HILL
31 C/13
86-LIM-001
86-WOL-004
86-WOL-005
86-WOL-001
Egan Creek
Shanty Creek
Bear Shanty Lake
John Lake
McCollum Lake
Powers Lake
Bald Lake
Tommy Lake
Mud Lake
Bear L.
Third Lake
Drumm Lake
Finnegan Lake
Sweets Lake
Ormsby
62
620
78
79
80
81
82
83
84
1250
1150
1200
1100
Miles 1
0
1
2
3 Milles
Metres 1000
1000
2000
3000
4000 Mètres
Yards 1000
4000 Verges
N

Sample Locations
Wollaston Township

1986 Marble Properties

BUILDING STONE INVENTORY

Property No. 86-CLA-001 **Pluton Name**

Property Name Swamp Creek **Commercial Stone Name** Marble

Geological Rock Name Calcitic marble

Township Clarendon **Lot** 31 **Con.** E & W Range

NTS 31C/15 **UTM Co-ordinates: Easting** 346250 **Northing** 4977700

Property Status Prospect **Air Photo No.** 78-4465-80-51,52

Production History Nil

Use of Explosives: Yes X **No** **Type** High velocity - roadcut

Colour: Fresh Surface White-greenish-pink-brown banded

Weathered Surface Grey

Uniform **Variable** X

Weathering Depth:

Grain Size: Fine to medium to coarse **Uniform** **Variable** X

Texture: Foliated **Uniform** **Variable**

Fabric: Yes X **No. Weak Mod. Strong** X **Strike** 55 degrees **Dip** N

Formed By Foliation

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 75 degrees **Dip** 55 degrees N **Spacing** 2 m

B) Strike 140 degrees **Dip** Vertical **Spacing** 2 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Good

Mineralogy: Calcite, minor phlogopite and tremolite.

Deleterious Minerals: **Yes** X **No** **Type** Pyrite, sphalerite **Percent** Trace

Other Features: Stringers of quartz, boudinage and brecciation

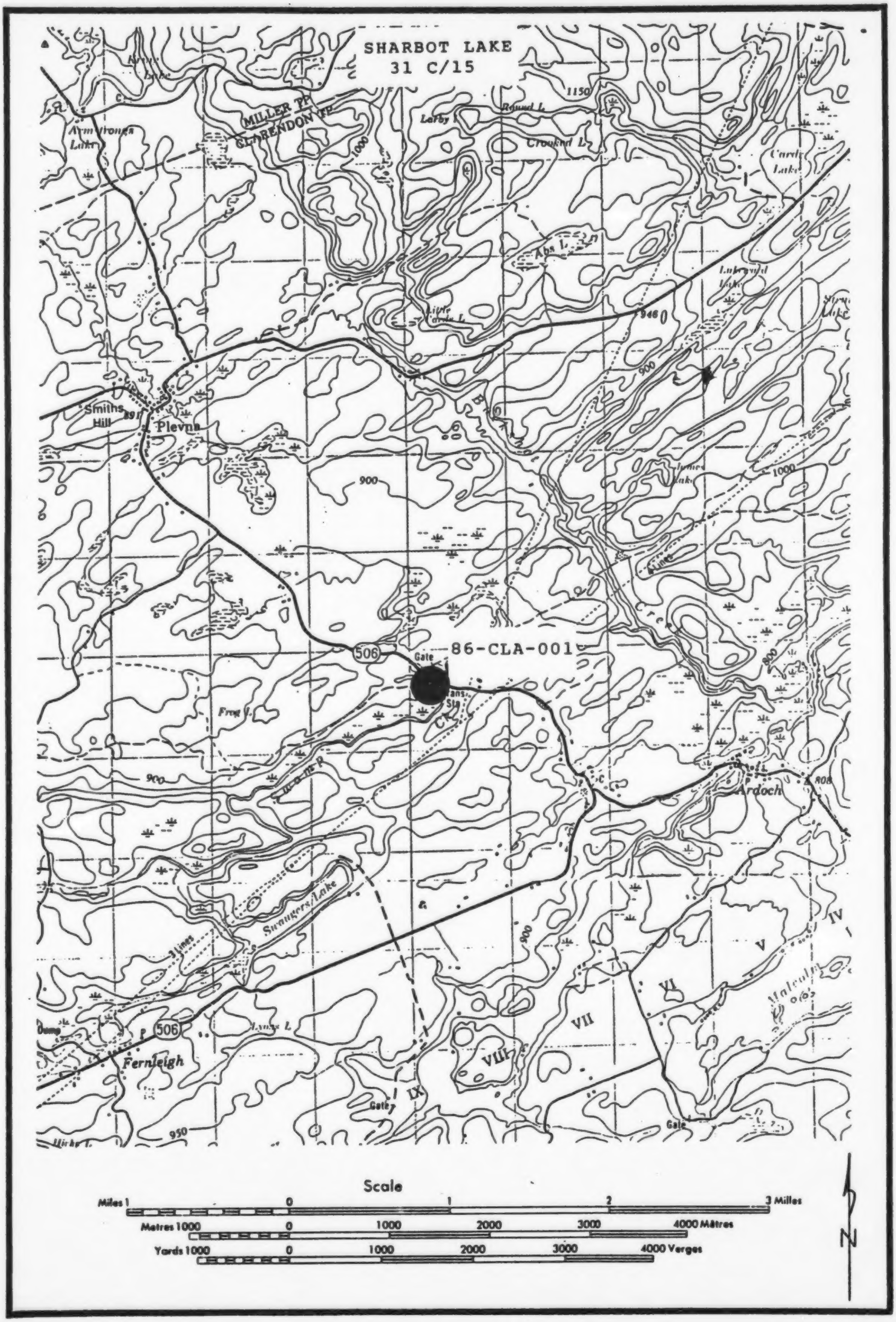
Possible Uses: Architectural stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This stone is a highly foliated calcitic marble breccia. Due to stretching of the fragments, textures vary from coarse, fragmental when viewed perpendicular to the foliation, to irregularly banded when viewed parallel to the foliation. Colour also varies from mottled brownish-grey and white at the south end of the road cut, to pink-grey-white at the north end. The interesting textures and colours and potential for large quarry blocks suggest that further investigation of this area is warranted.

Weathered surface above, fresh surface below. Note pencil for scale.
86-CLA-001

View showing texture of weathered surface. Pencil for scale.
86-CLA-001


SHARBOT LAKE
31 C/15
86-CLA-001
Armstrong Lake
MILLER TP
CLARENDON TP
Larby L.
Round L.
Crooked L.
Cardy Lake
Abs L.
Little Cardy L.
Lakeward Lake
Smiths Hill
Plevna
506
Gate
Frog L.
Ardoch
Swaugers Lake
Fernleigh
Malcolm
Lynx L.
IV
V
VI
VII
VIII
IX
1150
1000
946
900
950
800
Scale
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-DUN-001

Pluton Name

Property Name L'Amable

Commercial Stone Name Marble

Geological Rock Name Stromatolitic Marble

Township Dungannon

Lot 31 **Con.** E. Range

NTS 31/F/4 **UTM Co-ordinates: Easting** 280200 **Northing** 4988450

Property Status Prospect

Air Photo No.

Production History Nil

Use of Explosives: **Yes** X **No** **Type** High velocity - roadcut

Colour: **Fresh Surface** Banded pale grey and brown

Weathered Surface Buff to brown

Uniform X **Variable**

Weathering Depth: 1 m weathered cap; otherwise negligible

Grain Size: Fine to medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** **Mod.** **Strong** **Strike** **Dip** 10 degrees E (variable)

Formed By relict bedding-contorted

Bedding: **Yes** X **No** **Strike** **Dip** **Avg. Thickness** 1-2 cm

Jointing: **Regular Pattern** X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing** X

A) **Strike** 125 degrees **Dip** 80 degrees W. **Spacing** 0.5 m

B) **Strike** 360 degrees **Dip** 70 degrees E. **Spacing** 1 m

C) **Strike** 360 degrees **Dip** 10 degrees E. **Spacing** 1 m

D) **Strike** 65 degrees **Dip** 50 degrees N. **Spacing** 2 m

Potential For Quarry Blocks: Poor

Mineralogy: Calcite, brown bands contain 5-10% fine phlogopite; grey bands 1 % graphite; minor serpentine.

Deleterious Minerals: Yes X No **Type** Sulphides **Percent** 1%

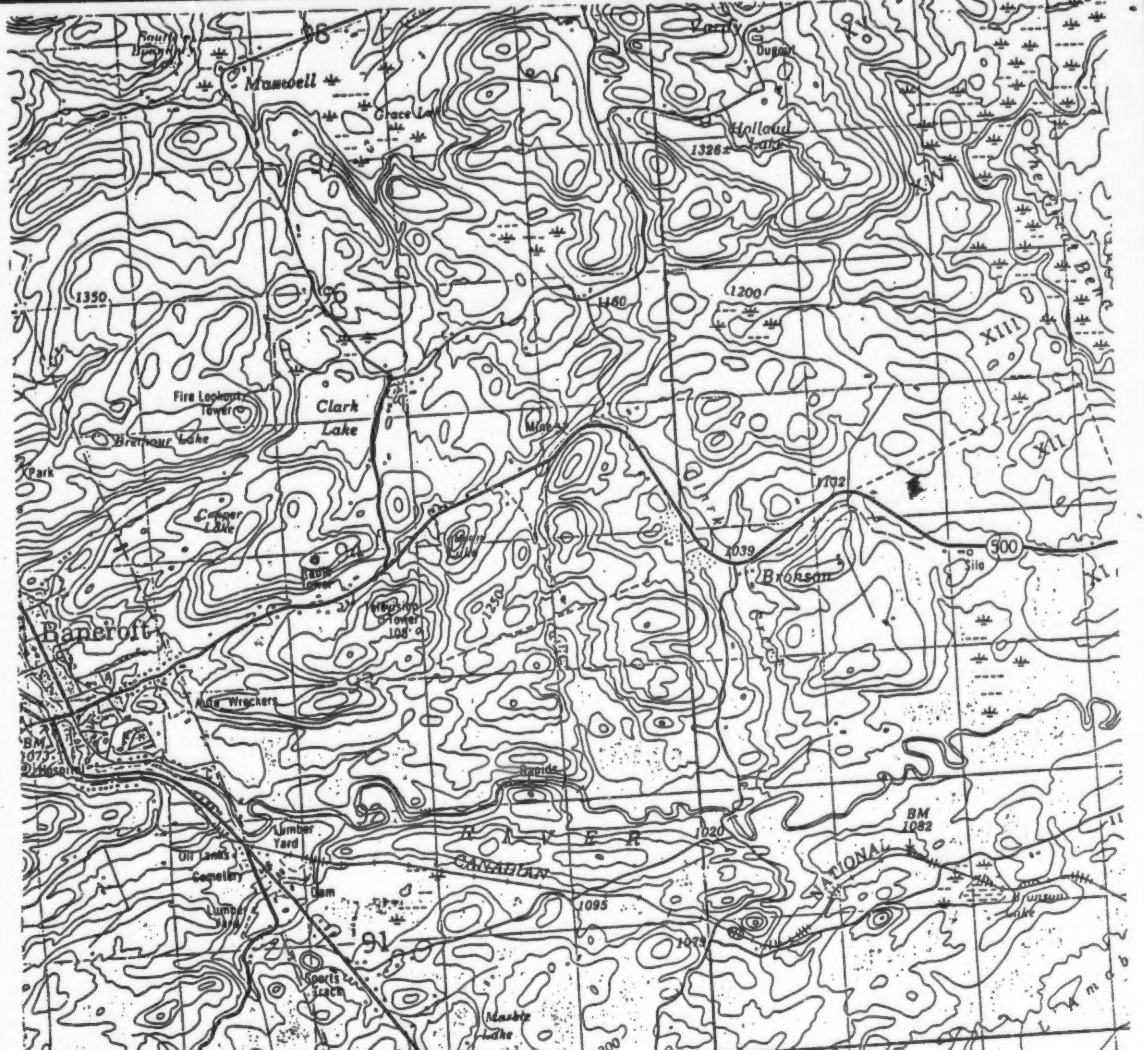
Other Features: Quartz veining; pitted, rusty weathering (pyrite); 1 m weathered cap.

Possible Uses: Ornamental, terrazzo

Outcrop Exposure: Good Fair Poor X

Comments: The polished stone is quite attractive but weathers poorly, limiting uses to interior ornamental stone or terrazzo.

Banding and jointing in marble roadcut. 86-DUN-001


Bancroft
Clark Lake
Fire Lookout Tower
Mumwell
Grace Lake
Holland Lake
Bronson
500
Canadian National
River
L'Amable Lake
Spurr Lake
Marble Lake
157
158
86-DUN-001
Green Corners
(L'Amable PO)
Trout Lake
62
98
96
92
91
90
89
87
1350
1160
1200
1020
1095
1079
BM 1082
Scale
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-FAR-020 **Pluton Name**

Property Name Barker Bancroft Brown Marble **Commercial Stone Name** Marble

Geological Rock Name Brown breccia

Township Faraday **Lot** 41 **Con.** 9

NTS 31F/04 **UTM Co-ordinates: Easting** 277500 **Northing** 4989500

Property Status Inactive **Air Photo No.**

Production History Former quarry (Barker)

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface White brown patches

Weathered Surface Brownish-grey

Uniform **Variable** X

Weathering Depth: Negligible

Grain Size: Fine to coarse **Uniform** **Variable** X

Texture: Foliated **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Foliation

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 20 degrees **Dip** 45 degrees NW **Spacing** 2 m

B) Strike Horizontal **Dip** **Spacing** 1.3 m

C) Strike 90 degrees **Dip** 70 degrees **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Calcite

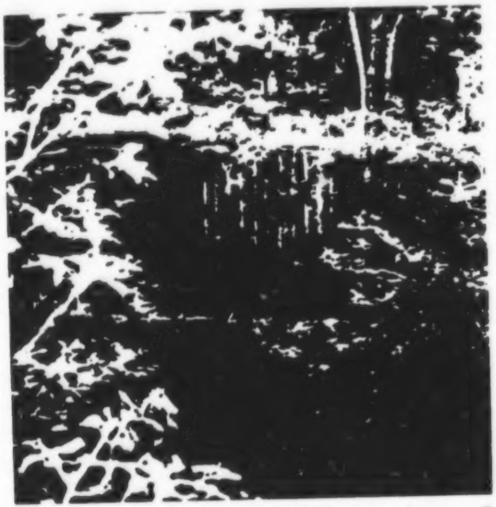
Deleterious Minerals: **Yes** X **No** **Type** Phlogopite **Percent** <5%

Other Features: Some large patches of phlogopite

Possible Uses: Architectural stone, ashlar, landscaping stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: The marble breccia found at this site is for the most part a brown and white patchy colour that does not appear very uniform throughout the outcrop area. The rock is foliated and is fine to coarse grained. The jointing is regular and moderate with 2 m spacing. Also present is horizontal jointing at about 1.5 m spacings. The outcrop area is fairly good and accessible from Highway #62. Some fairly large patches of phlogopite were noted and may decrease the potential of the stone. Further to the south is another quarry face and this area may warrant further investigation.



View showing benching in one of the brown breccia pits. 86-FAR-020

View showing potential block size from one of the brown breccia pits. 86-FAR-020

BUILDING STONE INVENTORY

Property No. 86-FAR-021

Pluton Name

Property Name Bancroft pink marble

Commercial Stone Name Marble

Geological Rock Name Pink calcitic marble

Township Faraday

Lot 41

Con. 9

NTS 31F/04

UTM Co-ordinates: Easting 277500

Northing 4989500

Property Status Inactive

Air Photo No.

Production History Former marble quarry (Barker)

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface Pale pink to dark pink with variable white-black bands

Weathered Surface Grey-brown

Uniform **Variable** X

Weathering Depth: Negligible

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** **Variable** X

Fabric: Yes X **No. Weak Mod. Strong** X **Strike** 30 degrees **Dip**

Formed By Foliation

Bedding: Yes **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 140 degrees **Dip** Vertical **Spacing** 1 m

B) Strike Horizontal **Dip** **Spacing** 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Calcite, phlogopite

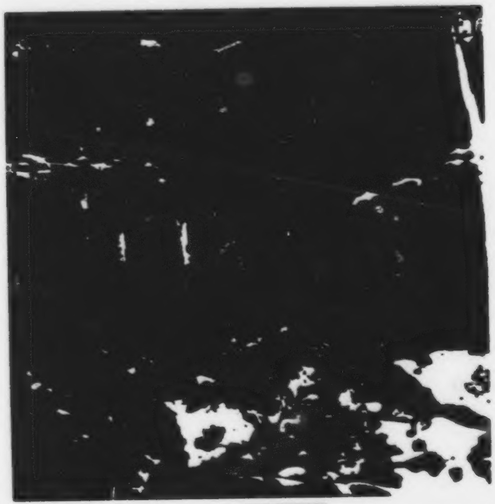
Deleterious Minerals: **Yes** **No** **X** **Type** **Percent**

Other Features: Some quartz veining, banding variable, as is colour.

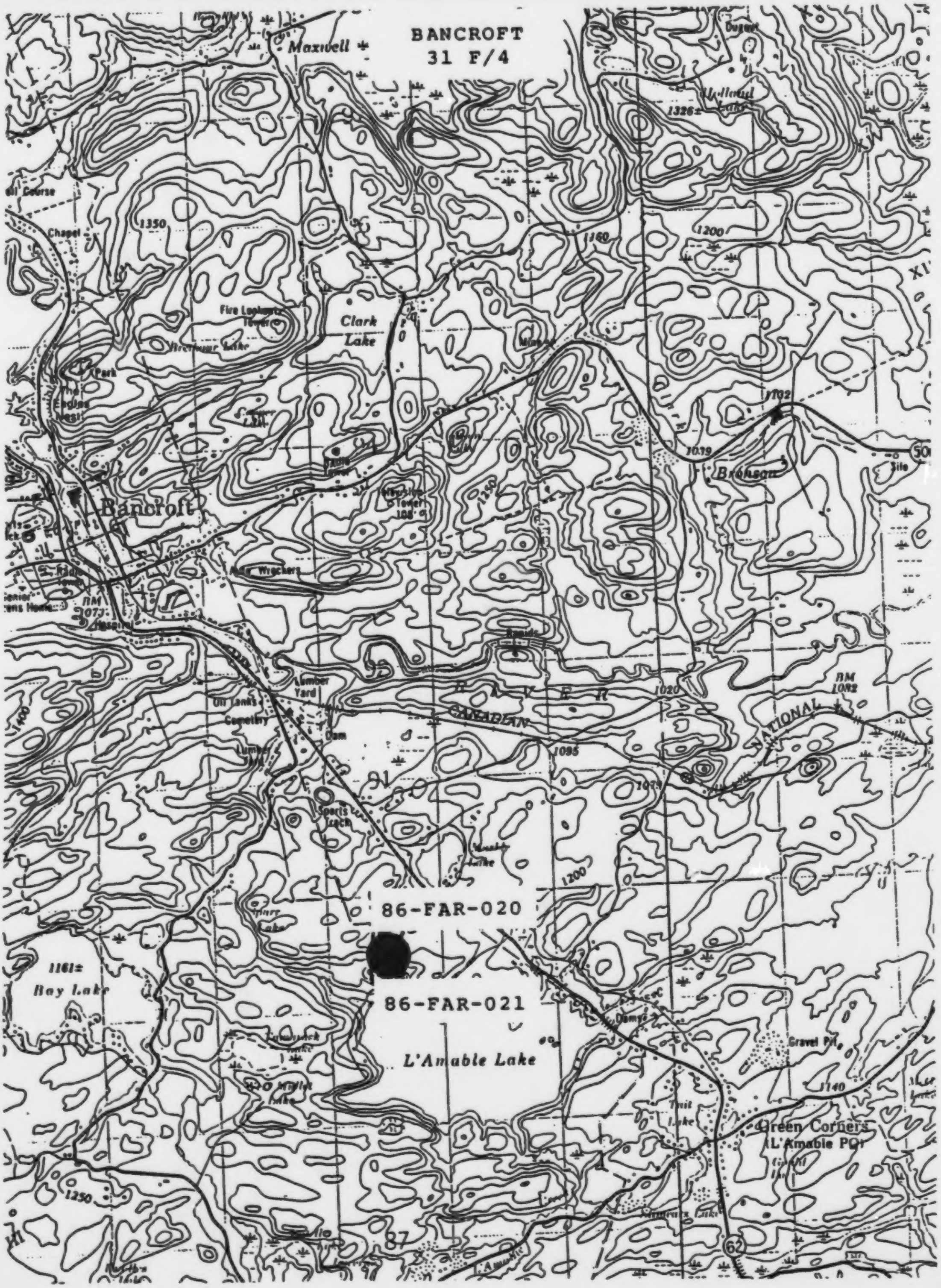
Possible Uses: Ornamental stone, architectural stone, landscaping stone, terrazzo chips

Outcrop Exposure: **Good** **Fair** **X** **Poor**

Comments: The rock appears to be quite attractive due to pink, white and black banding. Unfortunately the banding appears to be variable and large areas of homogeneous texture are difficult to find. Jointing is not optimal and is difficult to determine due to overburden. The attractiveness of this stone is such that the area warrants further investigation. Some quartz veining was noticed in the area.



View showing limited extent of pink marble. 86-FAR-021


BANCROFT
31 F/4
Maxwell
Clark Lake
Fire Lookout Tower
Bancroft
Bronson
1102
1326±
1350
1200
1160
1039
CANADIAN NATIONAL
1020
1085
1079
BM 1082
Lumber Yard
Cemetery
Dam
Sports Track
91
1200
86-FAR-020
86-FAR-021
1161±
Bay Lake
L'Amable Lake
Gravel Pit
Green Corners
L'Amable PO
1140
1250
62
87
500
Scale
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-KEN-030 **Pluton Name**

Property Name Baker Valley on Hwy. 7 **Commercial Stone Name** Marble

Geological Rock Name Dolomitic Marble

Township Kennebec **Lot** 19 NW 1/4 **Con.** 10

NTS 31C/15 **UTM Co-ordinates: Easting** 348300 **Northing** 4956900

Property Status Roadcut **Air Photo No.** 78-4452-157-[illegible]0

Production History Nil

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface White

Weathered Surface Dull white-greyish

Uniform **Variable** X

Weathering Depth: Nil

Grain Size: Fine to coarse **Uniform** X **Variable**

Texture: Foliated **Uniform** **Variable** X

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Foliation

Bedding: Yes X **No** **Strike** **Dip** **Avg. Thickness** 1.5 m

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair to poor

Mineralogy: Dolomite, tremolite, phlogopite

Deleterious Minerals: **Yes** X **No** **Type** Pyrite **Percent** Trace

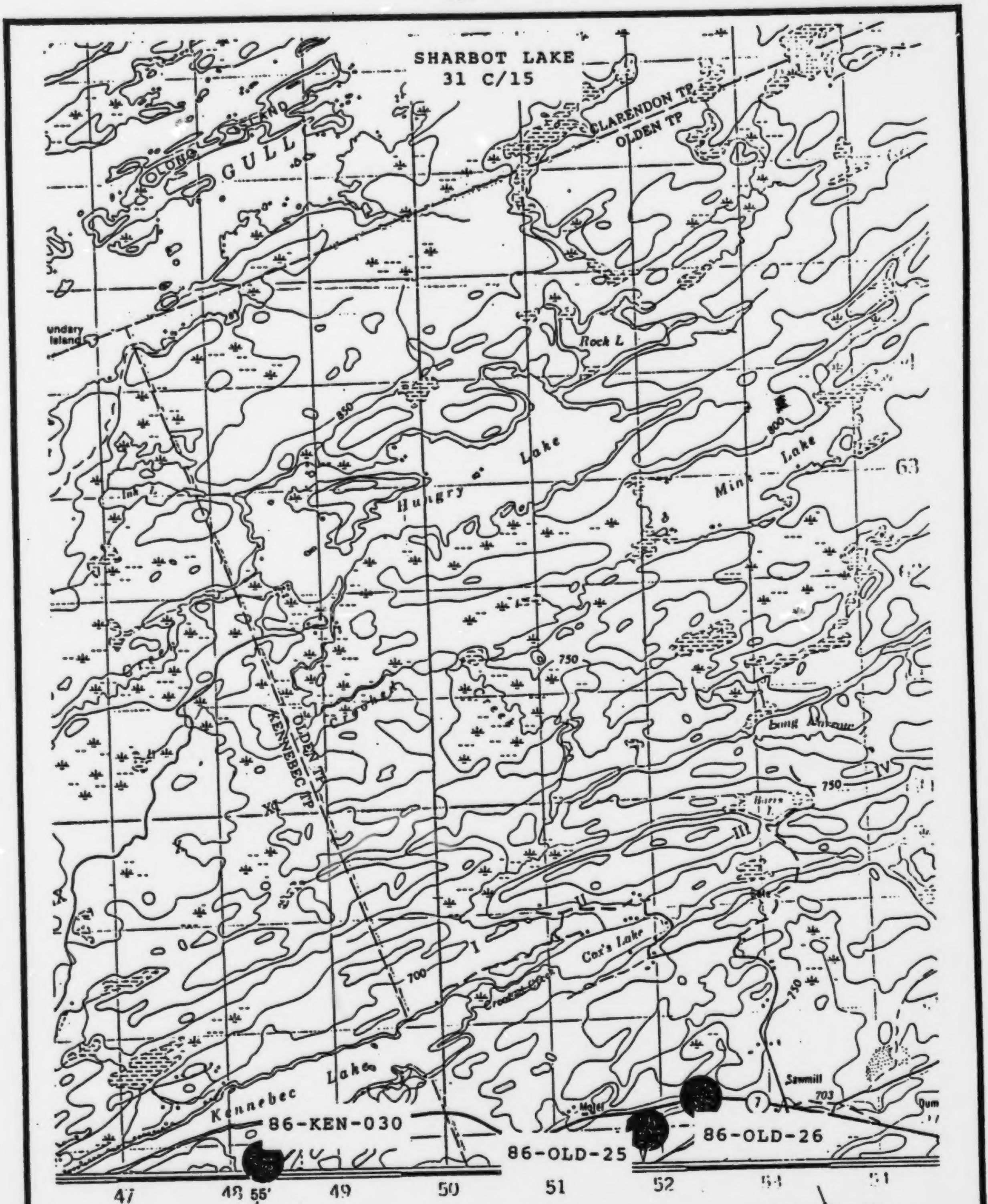
Other Features: Sub-parallel lineations; local coarse tremolite patches.

Possible Uses: Ashlar, structural stone, landscaping stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is a highly foliated dolomitic marble. For the most part it is whitish brown on the fresh surface, the brown being the result of bands of fine grained phlogopite. The stone may also appear greenish in some spots due to the presence of tremolite. Pyrite is present but only in trace amounts. Jointing appears regular and moderate but the outcrop area appears very limited. The rock is bedded with an average thickness of 1.5 m.

View of roadcut face showing foliation due to phlogopite bands. 86-KEN-030


SHARBOT LAKE
31 C/15
CLARENDON TP
OLDEN TP
LONG ISLAND
GULL
Boundary Island
Rock L
850
800
Hungry Lake
Mink Lake
63
62
Ink L
Crooked Creek
750
KENNEBEC TP
OLDEN TP
Long Arrow
750
III
II
I
700
Cox's Lake
Crooked Creek
750
Kennebec Lake
Sawmill
703
7
86-KEN-030
86-OLD-25
86-OLD-26
47
48 55'
49
50
51
52
53
54
Kaladar 20 km
Mountain Grove 2 km
Scale
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-MAD-030　　**Pluton Name**

Property Name Arena Road　　**Commercial Stone Name** Marble

Geological Rock Name Marble breccia

Township Madoc　　**Lot** 3　　**Con.** 6

NTS 31C/11　　**UTM Co-ordinates: Easting** 303600　　**Northing** 4931700

Property Status Inactive　　**Air Photo No.** 78-4436-127-160

Production History None-roadcut

Use of Explosives: Yes X　　**No**　　**Type**

Colour: Fresh Surface Pink-brown-grey-white

Weathered Surface Brown-dull

Uniform　　**Variable** X

Weathering Depth: up to 1/2 cm

Grain Size: Coarse grains in a fine grained matrix　**Uniform**　**Variable** X

Texture: Brecciated　　**Uniform** X **Variable**

Fabric: Yes X **No.**　**Weak**　**Mod.**　**Strong** X　**Strike**　**Dip**

Formed By Brecciation

Bedding: Yes X **No Strike** 135 degrees **Dip**　**Avg. Thickness** 2-3 m

Jointing: Regular Pattern　　**Irregular Pattern**

Limited Jointing　　**Moderate Jointing**　　**Intensive Jointing**

A) Strike　　**Dip**　　**Spacing**

B) Strike　　**Dip**　　**Spacing**

C) Strike　　**Dip**　　**Spacing**

D) Strike　　**Dip**　　**Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Calcite, quartz

Deleterious Minerals: Yes No X Type Percent

Other Features: Limited outcrop exposure

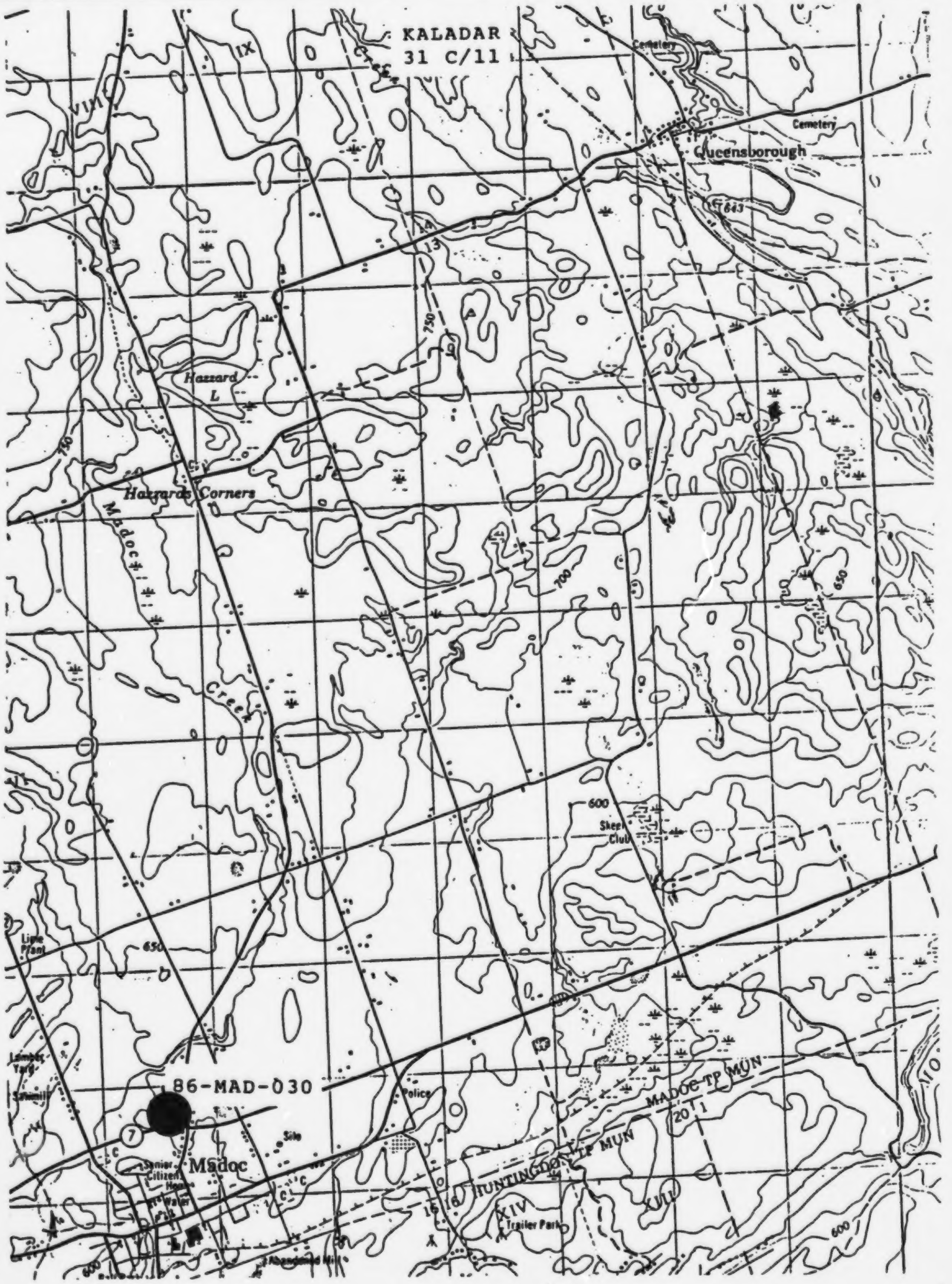
Possible Uses: Architectural stone, ornamental stone

Outcrop Exposure: Good Fair Poor X

Comments: This site displays a very unique marble breccia. It appears that very coarse (2-3 cm) dolomitic fragments are set in a fine grained calcitic matrix. The fragments are commonly banded and exhibit a variety of colours, including pink, brown, grey, white, yellow, red and orange, all of which combine to give this stone a striking colour mosaic appearance. The outcrop can be seen on both the north and south sides of Highway #7. On the north side the stone is light, on the south side it appears darker. The breccia zone strikes at about 135 degrees and is 2-3 m thick.

View showing extent of outcrop on north side of Hwy. #7. 86-MAD-030

Variable grain size and colouring. Note 6 inch ruler for scale. 86-MAD-030


KALADAR
31 C/11
IX
VIII
Creek
Cemetery
Cemetery
Queensborough
13
750
Hazzard L
Hazzards Corners
Madoc Creek
700
650
600
Sheet Club
Lime Plant
Lambert Yard
Sawmill
86-MAD-030
7
Madoc
Senior Citizens Home
Water
Site
Police
MADOC TP MUN
HUNTINGDON TP MUN
XIV
XIII
Trailer Park
Abandoned Mill
Scale
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-MAR-020 **Pluton Name**

Property Name Malone-South East (Bonter quarry) **Commercial Stone Name** Marble

Geological Rock Name Calcitic marble

Township Marmora **Lot** 17 **Con.** 11

NTS 31C/12 **UTM Co-ordinates: Easting** 293500 **Northing** 4937100

Property Status Inactive **Air Photo No.** 78-4439-13[illegible]-72

Production History Former marble quarry (terrazzo, crushed stone)

Use of Explosives: **Yes** X **No** **Type**

Colour: **Fresh Surface** White-greenish tinge

Weathered Surface Dull white

Uniform **Variable** X

Weathering Depth: 1 mm

Grain Size: Fine **Uniform** X **Variable**

Texture: Massive to slightly foliated **Uniform** **Variable** X

Fabric: **Yes** X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Foliation

Bedding: **Yes** **No** X **Strike** **Dip** **Avg. Thickness**

Jointing: **Regular Pattern** **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Calcite (serpentine, diopside)

Deleterious Minerals: **Yes** X **No** **Type** Pyrite **Percent** Trace

Other Features: Severe blast fractures distort true interpretation of jointing.

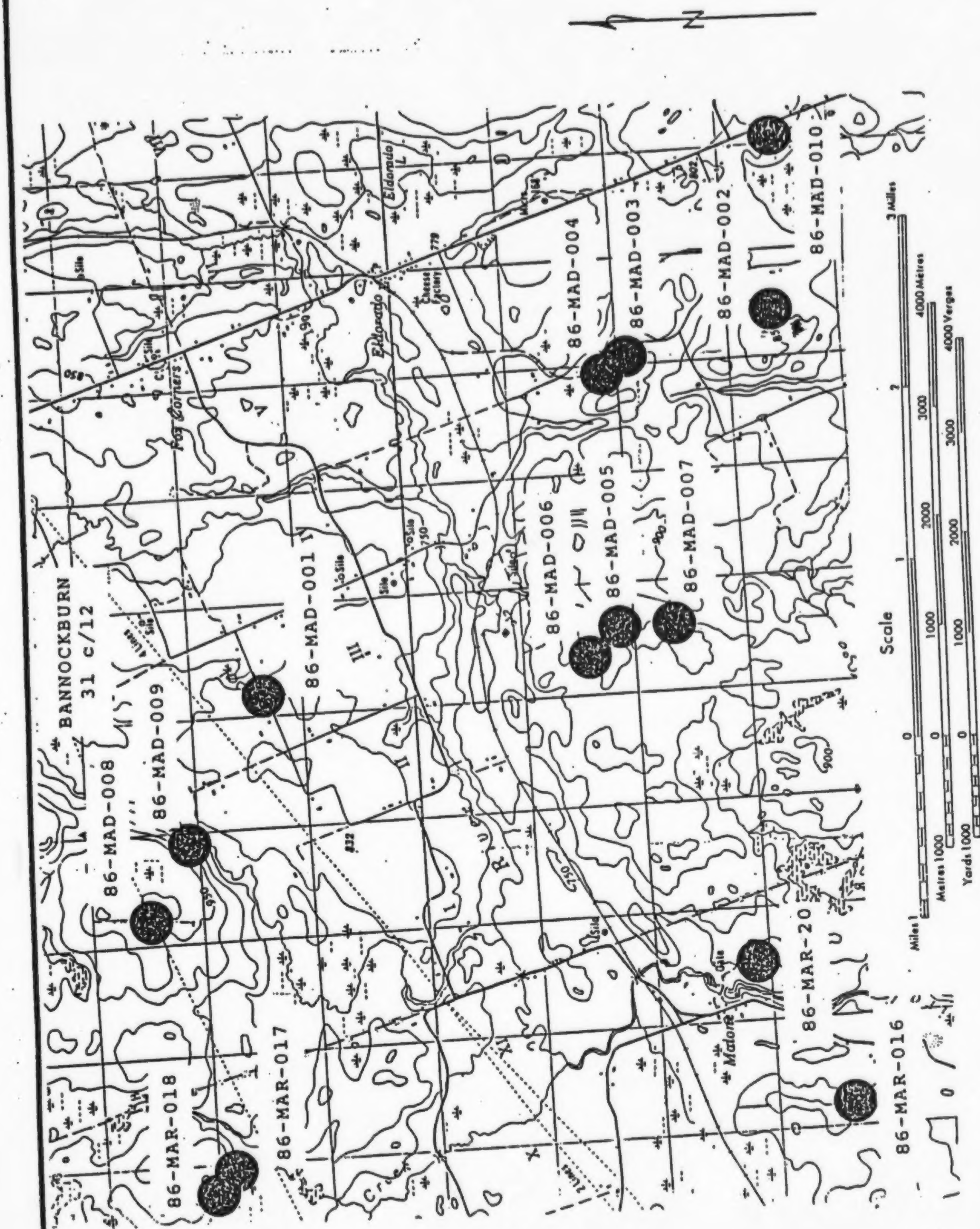
Possible Uses: Crushed stone, ornamental stone

Outcrop Exposure: **Good** X **Fair** **Poor**

Comments: This property appears to have very little potential for building stone except as small items such as bookends or other ornaments. The colour is dominantly white with a greenish tinge in some areas. Jointing is very intensive and irregular, probably due to blasting. Away from the quarry, it may improve but overburden prevents confirmation of this. The rock is predominantly massive but some foliation can be seen in the form of greenish bands and swirls which are likely diopside or serpentine. Minor pyrite was also noted.

East face of quarry. Note level of water and intensive jointing.
86-MAR-020

View of Malone marble showing fracturing due to explosives.
86-MAR-020


BANNOCKBURN
31 C/12
N
86-MAD-001
86-MAD-002
86-MAD-003
86-MAD-004
86-MAD-005
86-MAD-006
86-MAD-007
86-MAD-008
86-MAD-009
86-MAD-010
86-MAR-016
86-MAR-017
86-MAR-018
86-MAR-20
Fox Corners
Eldorado
Cheese Factory
Madoc
Silo
Creek
Scale
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Metres
Yards 1000
0
1000
2000
3000
4000 Yards

BUILDING STONE INVENTORY

Property No. 86-OLD-026 **Pluton Name**

Property Name Howard Gibbs **Commercial Stone Name** Marble

Geological Rock Name Dolomitic marble

Township Olden Twp. **Lot** 17 **Con.** 2

NTS 31C/15 **UTM Co-ordinates: Easting** 3523501 **Northing** 4957200

Property Status Roadcut **Air Photo No.** 78-4453-162-129,130,131

Production History None

Use of Explosives: Yes X **No** **Type** High velocity

Colour: Fresh Surface White

Weathered Surface Grey-black

Uniform X **Variable**

Weathering Depth: Nil

Grain Size: Medium **Uniform** X **Variable**

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Foliation

Bedding: Yes X **No** **Strike** **Dip** **Avg. Thickness** 2-3 m

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** **Intensive Jointing** X

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Dolomite, tremolite

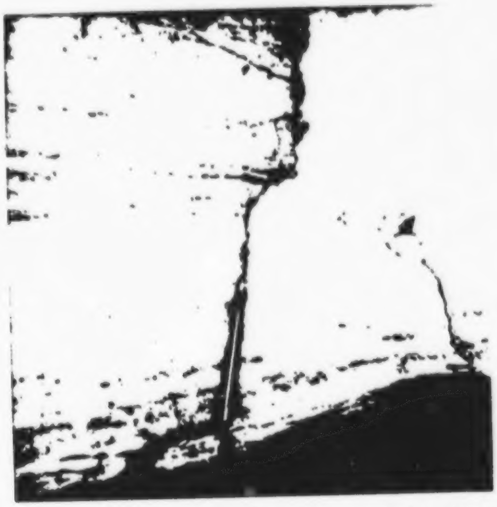
Deleterious Minerals: Yes X **No Type** Pyrite-phlogopite **Percent** Trace

Other Features:

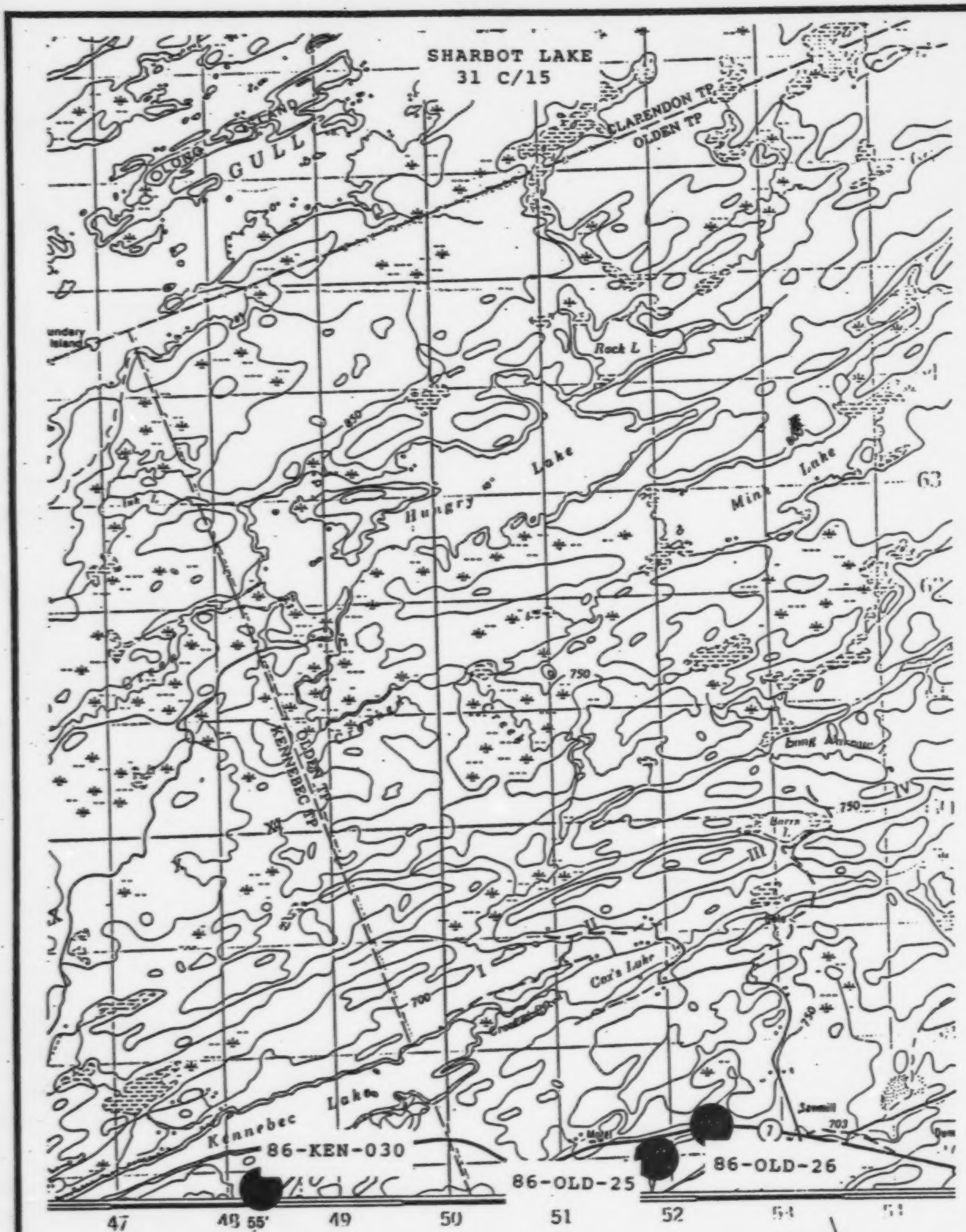
Possible Uses: Landscaping stone, ornamental stone, ashlar

Outcrop Exposure: Good Fair X **Poor**

Comments: This site is a roadcut on Highway #7 near Mountain Grove. It is a foliated dolomitic marble with medium grain size. The marble appears to be bedded with an average thickness of 2-3 m. In addition to dolomite, a major constituent is tremolite.
Pyrite and phlogopite are found in trace amounts. Overburden and blast fracturing hinder an accurate evaluation of the jointing but it appears fairly irregular and intense, limiting the building stone potential.



View showing foliation probably due to relict bedding. 86-OLD-026


SHARBOT LAKE
31 C/15
GULL
CLARENDON TP
OLDEN TP
Rock L
850
Hungry Lake
Mink Lake
63
62
750
KENNEBEC TP
OLDEN TP
Barrs L
750
700
Cox's Lake
750
Kennebec Lake
Sawmill
7
86-KEN-030
86-OLD-25
86-OLD-26
47
48 55'
49
50
51
52
53
54
Kaladar 20 km
Mountain Grove 2 km
Scale
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-OSO-010 **Pluton Name**

Property Name John Donelly Gravel Pit **Commercial Stone Name** Marble

Geological Rock Name Grey banded crystalline limestone

Township Oso **Lot** 23 **Con.** 5

NTS 31C/15 **UTM Co-ordinates: Easting** 371300 **Northing** 4967800

Property Status Inactive **Air Photo No.** 78-4459-128

Production History Former gravel pit

Use of Explosives: **Yes** **No** X **Type**

Colour: **Fresh Surface** White & grey banded

Weathered Surface White & grey banded

Uniform X **Variable**

Weathering Depth: Nil

Grain Size: Coarse **Uniform** X **Variable**

Texture: Foliated - granoblastic **Uniform** X **Variable**

Fabric: **Yes** X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Foliation - relict bedding

Bedding: **Yes** X **No** **Strike** 65 degrees **Dip** 50 degrees S. **Avg. Thickness**

Jointing: **Regular Pattern** X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 65 degrees **Dip** 50 degrees S. **Spacing** .5 m

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Calcite

Deleterious Minerals: **Yes** X **No** **Type** Pyrite **Percent** Trace

Other Features: Some areas of outcrop may show large dark patches of uncertain mineralogy

Possible Uses: Architectural stone. structural stone, ashlar

Outcrop Exposure: **Good** **Fair** **Poor** X

Comments: This crystalline limestone is quite attractive because of alternating white and grey bands of calcite. The texture of the rock is foliated with granoblastic, coarse grains. The site was once a gravel pit which caused a face of this rock to be exposed which displays the foliation quite well. The jointing appears to be fairly regular and moderate striking at about 65 degrees. The mineralogy is calcite with trace amounts of pyrite. Also present are large dark inclusions of uncertain mineralogy. This area may warrant further investigation.

Bedding with large mafic knots.
Note pencil for scale.
86-OSO-010

View showing foliated texture of rock. 86-OSO-010

BUILDING STONE INVENTORY

Property No. 86-OSO-011 **Pluton Name** Zealand Corners

Property Name Zealand Corners **Commercial Stone Name** Marble

Geological Rock Name Dolomitic marble

Township Oso **Lot** 20 **Con.** 6

NTS 31C/15 **UTM Co-ordinates: Easting** 371550 **Northing** 4965500

Property Status Roadcut **Air Photo No.** 78-4458-189-175,176,177

Production History Nil

Use of Explosives: Yes X **No** **Type** High velocity

Colour: Fresh Surface White

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: Nil

Grain Size: Medium **Uniform** X **Variable**

Texture: Slightly foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** X **Strong** **Strike** **Dip**

Formed By Foliation - Relict Bedding

Bedding: Yes **No** **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike **Dip** **Spacing**

B) Strike **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Dolomite

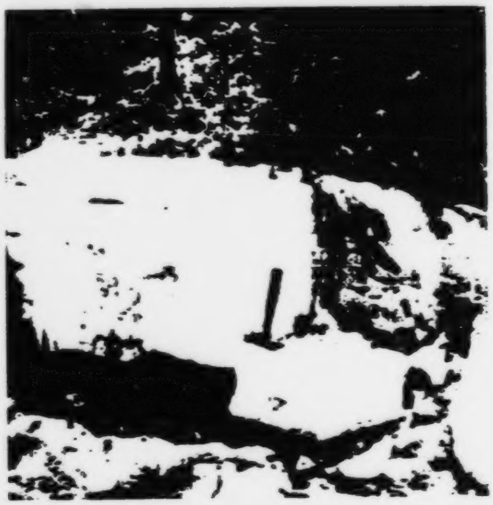
Deleterious Minerals: **Yes** X **No** **Type** Phlogopite-garnet **Percent** Trace

Other Features: Limited outcrop area

Possible Uses: Landscaping stone, ornamental stone, monument stone

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This site consists of a white dolomitic marble that displays slight foliation, perhaps due to relict bedding. The jointing pattern appears to be fairly regular and moderate, but not optimal for building stone extraction, except on a fairly small scale. The fresh surface of the rock displays an attractive white, medium grained, slightly foliated texture. Outcrop area is fair to poor in extent. Phlogopite and garnet are found in the stone in trace amounts.



View showing limited outcrop exposure, uniform massive texture and white colour. 86-OSO-011

BUILDING STONE INVENTORY

Property No. 86-OSO-012

Pluton Name

Property Name Ralph MacPherson

Commercial Stone Name Limestone

Geological Rock Name Grey banded limestone

Township Oso

Lot 21 **Con.** 4

NTS 31C/15 **UTM Co-ordinates: Easting** 369100 **Northing** 4965300

Property Status Inactive **Air Photo No.** 78-4458-189-173,174,175

Production History Former marble quarry

Use of Explosives: Yes X **No** **Type**

Colour: Fresh Surface Light whitish grey

Weathered Surface Dark grey

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Fine to coarse **Uniform** **Variable** X

Texture: Foliated **Uniform** X **Variable**

Fabric: Yes X **No.** **Weak** **Mod.** **Strong** X **Strike** **Dip**

Formed By Foliation

Bedding: Yes X **No** **Strike** **Dip** **Avg. Thickness**

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 65 degrees **Dip** 70 degrees S. **Spacing** .5 m

B) Strike 130 degrees **Dip** **Spacing**

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Fair

Mineralogy: Calcite, some tremolite

Deleterious Minerals: **Yes** X **No** **Type** Biotite **Percent** 5%

Other Features: Some biotite or hornblende pods.

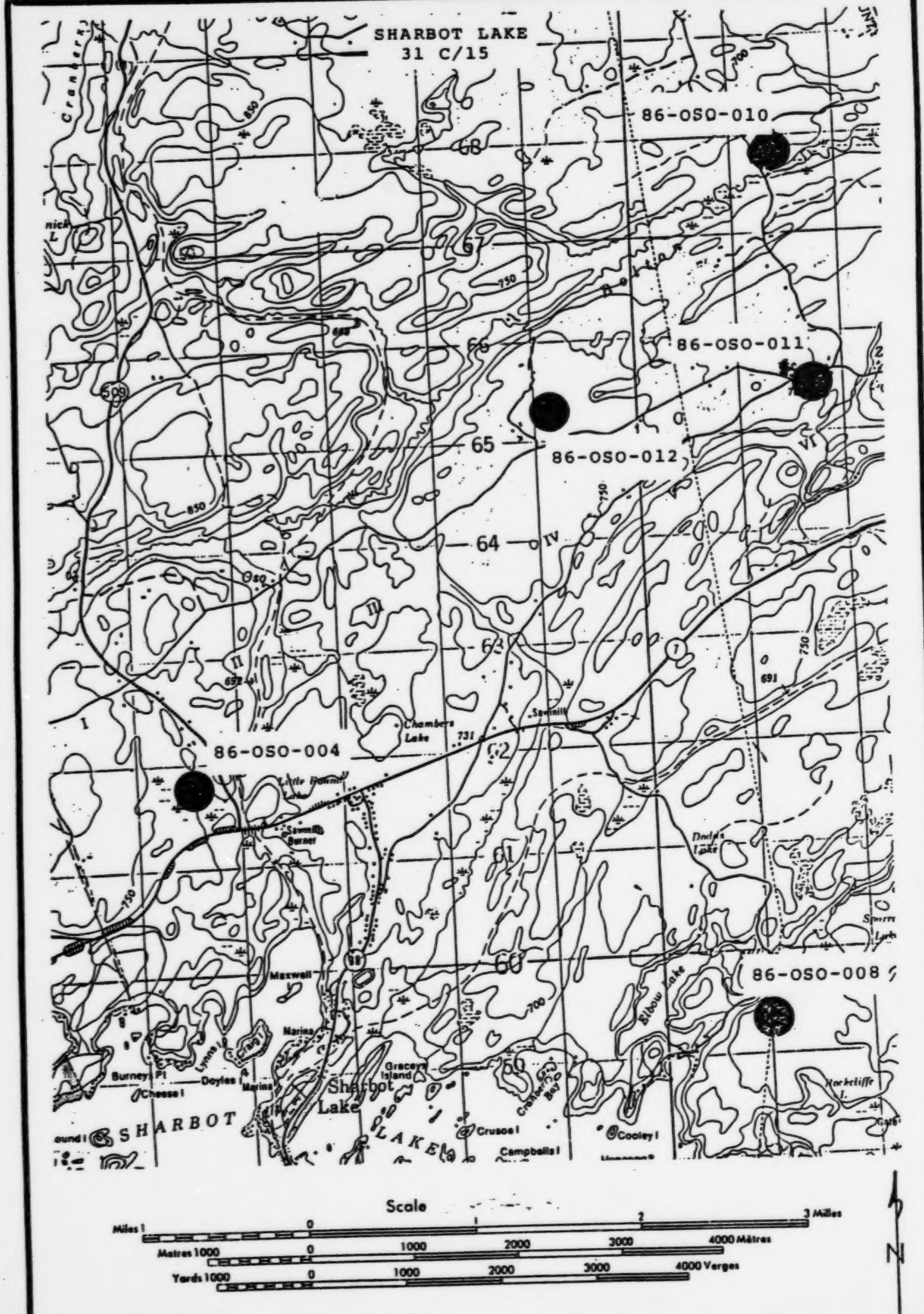
Possible Uses: Architectural stone, ornamental stone, ashlar

Outcrop Exposure: **Good** **Fair** X **Poor**

Comments: This rock is quite attractive and displays alternating bands of coarse, white calcite and fine to medium grained, greyish calcite. The bands vary in width but appear to be less than 2 cm on average. Establishing a definite joint pattern is difficult but blocks of 1 m X 1 m X 1 m have been removed and some are still at the site. Minor siliceous veining, biotite and hornblende pods (15 X 30 cm), and accessory tremolite are present in the marble. This quarry would only be suited for very small scale uses.

Overall view of outcrop with small pit to the left. 86-OSO-012

View showing face of quarry. Pit is almost entirely overgrown by small trees and brush. 86-OSO-012


SHARBOT LAKE
31 C/15
86-OSO-010
86-OSO-011
86-OSO-012
86-OSO-004
86-OSO-008
68
67
66
65
64
63
62
61
60
850
750
700
691
731
509
7
38
Chambers Lake
Sawmill
Little Round Lake
Sawmills Burner
Maxwell
Marina
Sharbot Lake
Graceys Island
Burneys Pt
Cheese I
Doyles I
Lynns I
Craig I
Crusoe I
Campbells I
Cooley I
Elbow Lake
Dodds Lake
Hockcliffe I.
SHARBOT
LAKE
Scale
Miles 1
0
1
2
3 Miles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

BUILDING STONE INVENTORY

Property No. 86-ROSS-001 **Pluton Name**

Property Name **Commercial Stone Name** Marble

Geological Rock Name Calcitic marble

Township Ross **Lot** 24 **Con.** 2

NTS 31/F/10 **UTM Co-ordinates: Easting** 361250 **Northing** 504650

Property Status Prospect **Air Photo No.**

Production History Nil

Use of Explosives: Yes X **No** **Type** High velocity - roadcut

Colour: Fresh Surface Banded pale and dark grey to blue-grey

Weathered Surface Black

Uniform X **Variable**

Weathering Depth: < 1 cm

Grain Size: Coarse **Uniform** X **Variable**

Texture: Banded **Uniform** X **Variable**

Fabric: Yes X **No. Weak Mod. Strong** X **Strike** 10 degrees **Dip** 80 degrees E (variable)

Formed By Colour banding

Bedding: Yes No Strike Dip Avg. Thickness

Jointing: Regular Pattern **Irregular Pattern** X

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 340 degrees **Dip** 90 degrees **Spacing** 0.3 to 1 m

B) Strike 100 degrees **Dip** 80 degrees S. **Spacing** 0.3 to 3 m

C) Strike **Dip** horizontal **Spacing** 0.3 to 1.5 m

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor to moderate

Mineralogy: Calcite; dark grey bands contain 1% graphite

Deleterious Minerals: Yes X No **Type** Pyrite **Percent** Trace

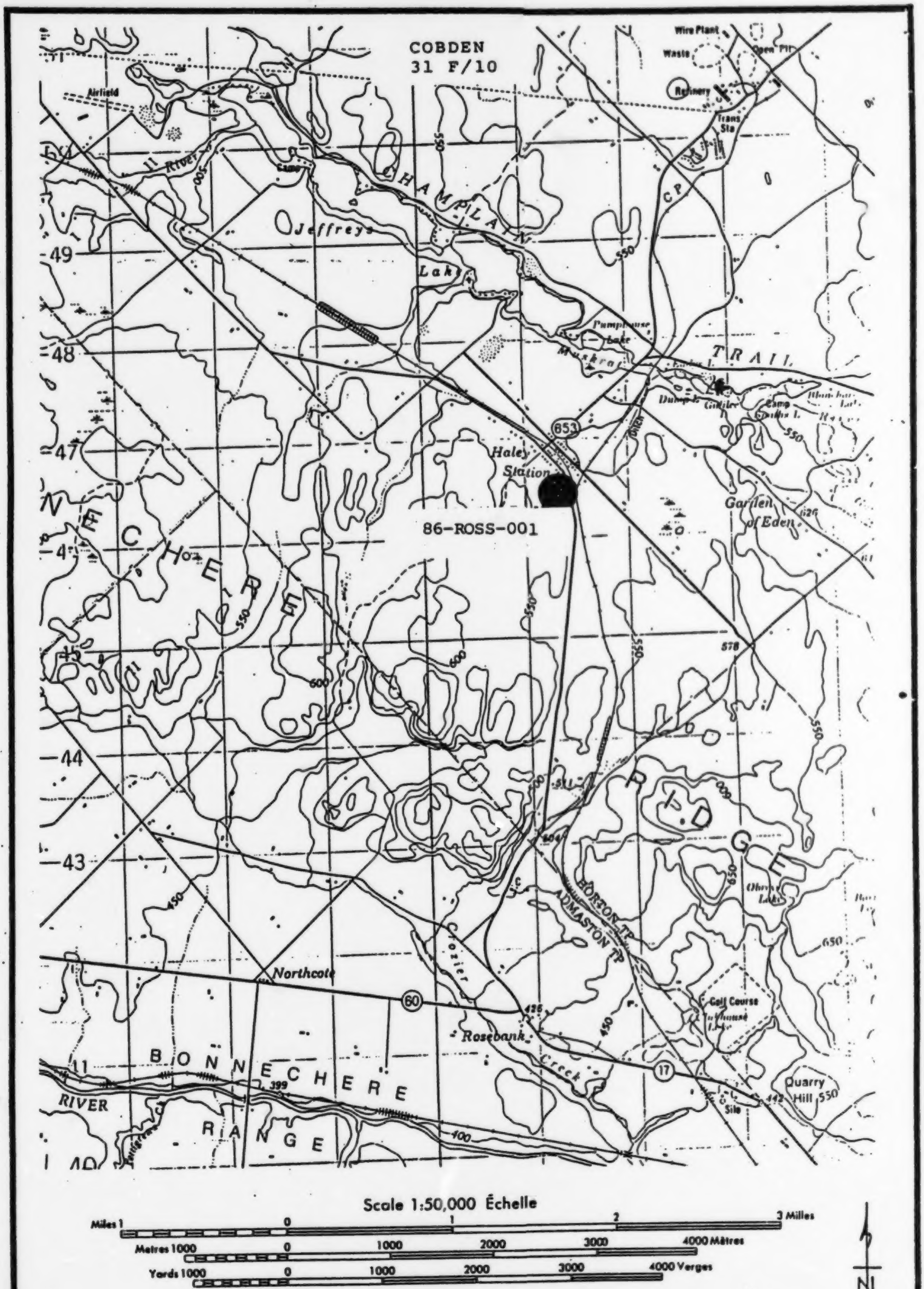
Other Features: Orange iron stain in pale grey bands, probably caused by oxidation of fine pyrite.

Possible Uses: Ashlar, ornamental stone, landscaping stone

Outcrop Exposure: Good **Fair** X **Poor**

Comments: Some large quarry blocks could be extracted, but the irregular joint pattern limits the potential as a quarry site.

Moderate jointing in banded
marble. 86-ROSS-001


COBDEN
31 F/10
86-ROSS-001
Haley Station
Jeffreys Lake
Pumphouse Lake
Muskrat
CHAMPLAIN TRAIL
Garden of Eden
Northcote
Rosebank
Crozier
Creek
Quarry Hill 550
Golf Course
HORTON TP
ADMASTON TP
BONNECHERE RIDGE
BONNECHERE RIVER
RANGE
Airfield
Wire Plant
Waste
Open Pit
Refinery
Trans Sta
CP
Dump
Galilee
Camp
Silo
653
60
17
49
48
47
45
44
43
550
600
650
450
400
Scale 1:50,000 Échelle
Miles 1 0 1 2 3 Milles
Metres 1000 0 1000 2000 3000 4000 Mètres
Yards 1000 0 1000 2000 3000 4000 Verges
N

1986 Limestone Properties

BUILDING STONE INVENTORY

Property No. 86-THUR-001 **Pluton Name**

Property Name Point Anne Quarry **Commercial Stone Name** Marble

Geological Rock Name Limestone

Township Thurlow **Lot** 23 & 24 **Con.** B.F.

NTS 31C/03 **UTM Co-ordinates: Easting** 317650 **Northing** 4992800

Property Status Active **Air Photo No.**

Production History McFarlane Construction Company, Canada Cement LaFarge

Use of Explosives: Yes X **No** **Type** High velocity

Colour: Fresh Surface Grey

Weathered Surface Grey

Uniform X **Variable**

Weathering Depth: Negligible

Grain Size: Lithographic to coarsely crystalline **Uniform** **Variable** X

Texture: Massive **Uniform** X **Variable**

Fabric: Yes **No.** X **Weak** **Mod.** **Strong** **Strike** **Dip**

Formed By

Bedding: Yes X **No** **Strike** Sub Horizontal **Dip** **Avg. Thickness** 1 m

Jointing: Regular Pattern X **Irregular Pattern**

Limited Jointing **Moderate Jointing** X **Intensive Jointing**

A) Strike 100 degrees **Dip** Vertical **Spacing** 1 m

B) Strike Horizontal **Dip** **Spacing** 1 m

C) Strike **Dip** **Spacing**

D) Strike **Dip** **Spacing**

Potential For Quarry Blocks: Poor

Mineralogy: Calcite

Deleterious Minerals: Yes **No** X **Type** **Percent**

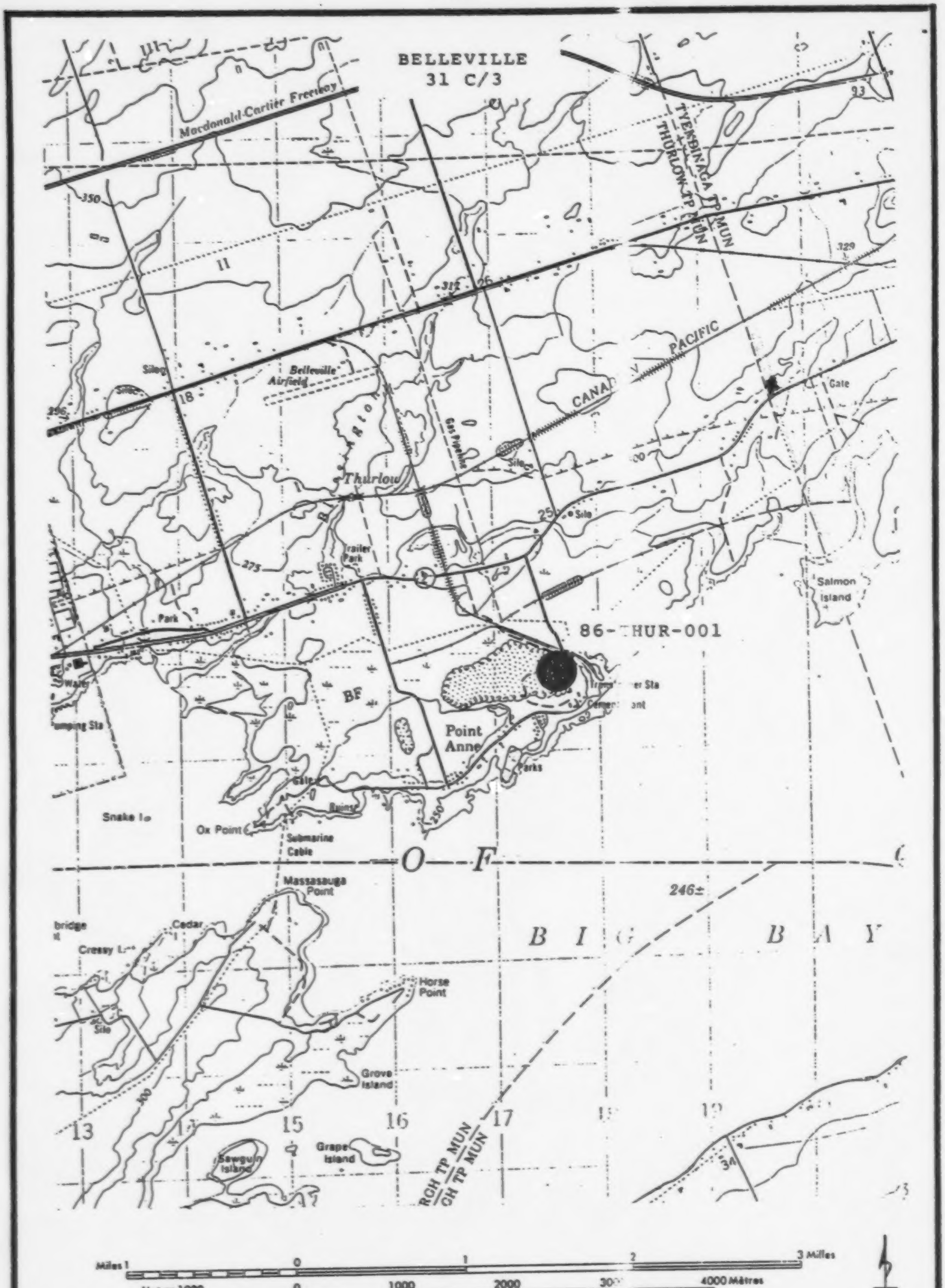
Other Features: Thin interbeds of shale

Possible Uses: Crushed aggregate

Outcrop Exposure: **Good X Fair Poor**

Comments: The Point Anne quarry displays limestone bedded to a maximum thickness of 1 m. The grain size varies from lithographic to coarsely crystalline with a massive texture. At present it appears that McFarlane Construction Company is quarrying Bobcageon Formation limestone for crushed aggregate. The main part of the quarry is under approximately 50 feet of water and is inactive. The northeast section of the property is presently being worked by McFarlane and is the only active part of the quarry. The jointing is fairly regular and moderate and blocks of 1 m cubed could be removed. Also present are minor interbeds of shale.

View of N.E. wall of quarry, thin shale bed at eye level.
86-THUR-001


BELLEVILLE
31 C/3
Macdonald-Cartier Freeway
TYENDINAGA TP MUN
THURLOW TP MUN
350
11
312
26
329
Silo
18
Belleville Airfield
CANADIAN PACIFIC
Gas Pipeline
Thurlow
Silo
25
Silo
Gate
Trailer Park
275
2
Park
Salmon Island
86-THUR-001
Pumping Sta
BF
Point Anne
Parks
Gate
Snake I.
Ox Point
Submarine Cable
250
O F
246±
Massassauga Point
Cedar
Cressy
Silo
B I G B A Y
Horse Point
Grove Island
300
13
15
16
17
Grape Island
Sawguin Island
RGH TP MUN
GH TP MUN
34
Miles 1
0
1
2
3 Milles
Metres 1000
0
1000
2000
3000
4000 Mètres
Yards 1000
0
1000
2000
3000
4000 Verges
N

Appendix 3
List of Granite Properties Examined 1985-86
Grouped by Pluton

1986 Property Examinations - Granite

Pluton Name	Property Report	Potential
Abbotts Hill	86-OLD-007	Poor
	86-OLD-008	Poor
	86-OLD-009	Poor
	86-KEN-007	Poor
	86-KEN-008	Poor
	86-KEN-009	Poor
	86-KEN-010	Poor
Addington	86-OLD-003	Poor
	86-OLD-004	Poor
Beaver Creek	86-TUD-003	Poor
	86-TUD-004	Poor
	86-TUD-005	Poor
	86-TUD-006	Poor
	86-TUD-007	Poor
	86-TUD-008	Poor
Bishop Corners Formation	86-KAL-009	Moderate
Coe Hill	86-WOL-006	Poor
	86-WOL-007	Moderate
	86-WOL-008	Moderate
	86-WOL-009	Poor
	86-WOL-010	Moderate
Cordova	86-MAR-001	Poor
	86-MAR-002	Poor
	86-MAR-003	Poor
	86-MAR-004	Poor
	86-MAR-014	Poor
	86-MAR-015	Poor
Crow Lake	86-SCRO-001	Poor
Deloro	86-MAR-005	Poor
	86-MAR-006	Poor
	86-MAR-007	Mod-Good
	86-MAR-008	Good
	86-MAR-009	Mod
	86-MAR-010	Mod-Good
	86-MAR-011	Mod
	86-MAR-012	Poor
	86-MAR-013	Mod
	86-MAD-002	Poor
	86-MAD-003	Poor
	86-MAD-004	Poor
	86-MAD-005	Poor
	86-MAD-006	Poor
	86-MAD-007	Poor
	86-MAD-010	Mod

Elzevir	86-KAL-001	Poor-Mod
	86-KAL-002	Poor-Mod
	86-KAL-004	Poor
	86-KAL-005	Poor-Mod
	86-ELZ-001	Poor
	86-ELZ-002	Poor
	86-ELZ-003	Poor-Mod
	86-ELZ-004	Mod
	86-ELZ-005	Poor
	86-ELZ-006	Poor-Mod
	86-ELZ-007	Poor-Mod
	86-ELZ-008	Poor-Mod
	86-ELZ-009	Poor-Mod
Empey	86-MAD-001	Poor
Gawley Creek	86-MAR-017	Poor
	86-MAR-018	Poor
	86-MAD-008	Poor
	86-MAD-009	Poor
Glanmire	86-TUD-009	Poor
	86-TUD-010	Poor
	86-TUD-011	Poor
	86-TUD-012	Poor
Lanark-Oso	86-OSO-001	Poor
	86-OSO-002	Poor
	86-OSO-003	Poor
	86-OSO-008	Poor
	86-SSHER-001	Poor
Lavant	86-OSO-005	Poor
	86-OSO-006	Poor
	86-OSO-007	Poor
	86-LAV-001	Poor
Leggat Lake	86-OLD-005	Poor-Mod
	86-OLD-006	Poor
	86-OLD-010	Poor
	86-OLD-011	Poor
	86-OLD-012	Poor
	86-OLD-013	Poor
	86-OLD-014	Poor
Malone	86-MAR-016	Poor
McLean	86-OLD-015	Poor
	86-OLD-016	Poor
	86-OLD-017	Poor
	86-OLD-018	Poor
	86-OLD-019	Poor
	86-OLD-020	Mod
	86-OLD-021	Poor
	86-OLD-022	Mod

	86-HIN-002	Poor
	86-KEN-011	Poor
	86-KEN-012	Poor
Methuen and Belmont	86-BEL-001	Poor
	86-MET-001	Poor
Mount Moriah	86-ELZ-010	Poor
	86-ELZ-011	Poor-Mod
	86-ELZ-012	Poor
	86-GRI-001	Poor-Mod
	86-GRI-002	Poor-Mod
	86-GRI-003	Poor-Mod
	86-GRI-004	Poor-Mod
	86-GRI-005	Good
Mountain Grove	86-OLD-027	Poor
Newboro	86-NCROS-005	Poor
Northbrook	86-KAL-006	Poor
	86-KEN-001	Mod
	86-KEN-002	Poor-Mod
	86-KEN-003	Poor-Mod
	86-KEN-004	Poor-Mod
	86-KEN-005	Poor
	86-KEN-006	Poor
Rideau Lake	86-NBURG-001	Poor
	86-NBURG-002	Poor
	86-NBURG-003	Poor
	86-NBURG-004	Poor
	86-NBURG-005	Poor
Skootamatta Lake	86-ANG-001	Poor
	86-ANG-002	Poor
	86-ANG-003	Poor
	86-GRI-006	Poor
	86-GRI-007	Poor
Tamworth, Bellrock Wilkinson, First Depot	86-CAM-001	Poor
	86-POR-001	Poor
	86-POR-002	Poor
	86-POR-003	Poor
	86-POR-004	Poor
	86-HIN-001	Poor-Mod
The Ridge	86-WOL-012	Poor
Umfraville	86-WOL-004	Poor
	86-WOL-005	Poor
Wadsworth	86-TUD-001	Poor
	86-TUD-002	Poor

Weslemkoon	86-DEN-001	Poor
Westport	86-NCROS-001	Poor
	86-NCROS-002	Poor
White Lake	86-OSO-004	Poor
	86-OLD-001	Poor
	86-OLD-002	Poor
Wolfe Lake	86-NCROS-003	Poor
	86-NCROS-004	Poor
Wollaston Granite	86-WOL-002	Poor
	86-WOL-003	Poor
	86-WOL-011	Poor
Wollaston Lake Gabbro	86-WOL-013	Poor
Township		
Chandos	86-CHA-001	Poor
Hungerford	86-HUN-001	Poor
Limerick	86-LIM-001	Poor
Madoc	86-MAD-031	Poor-Mod
Olden	86-OLD-025	Good
Wollaston	86-WOL-001	Mod

1985 Property Examinations

Pluton Name	Property Report	Potential
Battersea	85-STO-01	Good (active quarry)
	85-STO-02	Mod-Good
Coe Hill	85-WOL-01	Mod
	85-WOL-02	Poor-Mod
Gananoque Syenite	85-FLL-04	Moderate
Glamorgan Gabbro	85-CAV-02	Poor
	85-GLA-01	Poor-Mod
	85-GLA-02	Poor
Gooderham Syenite	85-MON-01	Good
LaRose Bay Diorite	85-RLL-04	Moderate-Good
Lyndhurst	85-RLL-01	Moderate (active quarry)
	85-RLL-02	Poor
	85-RLL-06	Good
	85-RLL-07	Good
	85-RLL-08	Good
Mallard Lake	85-DUN-06b	Moderate
Sheffield	85-HUG-01	Poor
Taylor	85-FLL-01	Good
	85-FLL-02	Good
	85-FLL-03	Poor
	85-FLL-05	Poor
Pittsburgh	85-PIT-01	Poor-Mod

Township		
Burleigh	85-BUR-01	Good
Carlow	85-CARL-01	Mod-Good
Cavendish	85-CAV-01	Poor
Elizabethtown	85-ELI-01	Poor
Elizabethtown	85-ELI-02	Poor
Front of Escott	85-FOE-01	Poor
Front of Escott	85-FOE-02	Poor
Front of Yonge	85-KAL-01	Mod-Good
Kaladar	85-KAL-01	Mod-Good
Pittsburgh	85-PIT-02	Poor
Raglan	85-RAG-01	Good
Rear of Leeds and Lansdowne	85-RLL-05	Poor
Rear of Yonge	85-ROY-01	Poor
Wollaston	85-WOL-03	Poor

Appendix 4

Report: ASTM Tests on Granite and Marble Samples from the Ontario Department of Northern Development and Mines;

R.L. Chevrier, August 1987

Energy, Mines and Resources Canada
Energie, Mines et Ressources Canada

CANMET

MINERAL SCIENCES LABORATORIES
INTERNAL REPORT

ASTM Tests on Granite and Marble Samples from the Ontario Department of Northern Development and Mines (Job No. 025506)

R. L. Chevrier
Construction Materials Section, MSL

August 1987

Field Trip ☐ Plant Visit ☐ Conference, Convention, Symposium ☐

Test Report ☒

REPORT NO. MSL-INT

INTRODUCTION

This report presents results of ASTM testing on prepared building stone samples supplied by the Ontario Department of Northern Development and Mines, Tweed, Eastern Region. The work was requested by Mr. Ron Collings, Head, Non-Metalic Minerals Section and was carried out in the Construction Materials Laboratory of MSL.

Apart from freeze-thaw durability, all other requested ASTM tests were performed in accordance with standards for natural building stones. Freeze-thaw durability tests were carried out using ASTM C666 (Proceedure A) normally specified for testing concrete specimens.

SAMPLE PREPARATION

The load bearing faces of each specimen tested in compression (ASTM C170) were ground and polished to obtain parallel and planer surfaces. Specimens were later checked for planarity using a machined-steel surface in accordance with note 4 of ASTM C170.

For ASTM C97, C241, C99, C880 and C666, specimens were tested as received.

PRECONDITIONING

Specimens for compression (ASTM C170), flexural (ASTM C880) and modulus of rupture (ASTM C99) were tested wet after being immersed for 48 hours in water at a temperature of approximatly 20°C..

Specimens for freeze-thaw durability were tested after being immersed 48 hours in water at 20°C and 1 hour at 5°C.

TEST RESULTS

A total of 6 granite (no. 1,10,12,13,52,82) and 3 marble (no. 29,31,71) samples were received and each was tested as follows:

Test	ASTM	No. of Specimens	Specimen size inches
Absorption	C97	3	2 x 2 x 3
Bulk Specific Gravity	C97	3	2 x 2 x 1
Abrasion Resistance	C241	3	2 x 2 x 1
Modulus of Rupture	C99	3	4 x 8 x 2.25
Compressive Strength	C170	3	2 x 2 x 3
Flexural Strength	C880	3	1 x 1.5 x 12
Freeze-Thaw Durability	C666*	2	4 x 8 x 2.25

*Proceedure "A"

A summary of test results is presented in tables 1 and 2. Detailed test results are given in appendix I (tables A1,A2 and A3) and ASTM test specifications are reproduced in appendix II.

Table 1 - Summary of test results

Type of Stone	Sample No.	ASTM C97		ASTM C241	ASTM C99	ASTM C170		ASTM C880
		Absorption (by weight). %	Bulk Specific Gravity	Abrasion Resistance, Ha	Modulus of Rupture, MPa	Compressive Strength, MPa		Flexural Strength, Mpa
						51x51x76-mm specimens	corresponding cube strength*	
Granite	1	0.11	2.68	62.9	11.8	176.8	190.0	13.1
	10	0.17	2.66	68.6	11.6	211.0	226.9	15.0
	12	0.04	2.76	67.7	15.2	169.6	183.2	15.8
	13	0.07	2.72	71.0	13.2	191.2	205.0	13.3
	52	0.10	2.72	64.0	11.5	141.9	153.0	-**
	82	0.15	2.61	51.2	11.6	144.2	154.8	10.0
Marble	29	0.03	2.78	23.1	10.2	153.0	164.8	5.3
	31	0.04	2.87	9.6	9.3	169.0	181.7	5.7
	71	0.08	2.73	10.7	6.3	79.4	85.0	5.9

* Calculated as per section 9.2 of ASTM C170

** Specimens not available

Note: Each value is average of 3 test specimens

Table 2 - Summary of freezing and thawing test results

Type of Stone	Sample No.	ASTM C666 (Proceedure A)			
		Weight change, %	Pulse velocity change, %	Frequency change, %	Modulus of rupture after 300 cycles, Mpa
Granite	1	0.0	4.8	5.1	11.1
	10	0.0	1.4	3.1	17.2
	12	0.0	1.0	-1.0	17.3
	13	0.0	2.4	-9.6	17.7
	52	0.0	0.8	5.6	14.0
	82	0.0	1.1	1.1	11.8
Marble	29	0.0	1.7	1.1	11.3
	31	0.0	1.3	1.8	8.6
	71	0.0	8.7	7.1	6.0

Note: Each value is average of 2 test specimens

APPENDIX I

DETAILED TEST RESULTS

Table Al - Absorption, bulk specific gravity and abrasion resistance

Type of Stone	Sample No.	Absorption, %			Specific Gravity			Abrasion, Ha		
		max.	min.	aver.	max.	min.	aver.	max.	min.	aver.
Granite	I	0.II2	0.I03	0.II	2.690	2.676	2.68	69.94	55.07	62.9
	I0	0.20I	0.I43	0.I7	2.667	2.660	2.66	76.69	6I.66	68.6
	I2	0.050	0.037	0.04	2.759	2.755	2.76	75.05	6I.33	67.7
	I3	0.073	0.067	0.07	2.732	2.695	2.72	72.99	68.00	7I.0
	52	0.II6	0.08I	0.10	2.7I6	2.7I4	2.72	66.33	59.84	64.0
	82	0.I62	0.I38	0.I5	2.6I0	2.608	2.6I	52.8I	48.09	5I.2
Marble	29	0.054	0.0I9	0.03	2.808	2.749	2.78	25.03	20.70	23.I
	3I	0.045	0.04I	0.04	2.867	2.865	2.87	I0.57	8.64	9.6
	7I	0.087	0.075	0.08	2.732	2.73I	2.73	II.08	I0.38	I0.7

Table A2 - Compressive strength, flexural strength and modulus of rupture test results on individual specimens

Type of Stone	Sample No.	Compressive Strength, MPa			Flexural Strength, Mpa			Modulus of Rupture, MPa		
		1	2	3	1	2	3	1	2	3
Granite	1	167.3	180.8	182.3	13.8	12.7	12.8	11.4	11.8	12.2
	10	207.0	223.0	202.1	13.7	15.8	15.5	11.4	11.3	12.1
	12	177.5	174.1	157.3	15.7	15.0	16.8	16.4	12.1	17.1
	13	171.9	201.1	200.8	12.9	14.3	12.7	16.2	10.4	12.9
	52	144.8	141.0	139.9	-	-	-*	11.9	10.1	12.3
	82	134.9	159.3	138.4	9.7	10.0	10.3	11.3	11.6	12.0
Marble	29	158.6	160.4	140.0	5.6	5.0	-**	9.9	9.6	11.1
	31	169.0	167.2	170.7	6.3	4.5	6.3	9.2	9.4	-***
	71	79.7	80.5	78.0	5.7	6.2	5.7	5.0	6.7	7.2

* Specimens not available

** Specimen broken in transport

*** Faulty specimen

Table A3 - Freezing and thawing test results on individual specimens

Type of Stone	Sample and spec. no.		Weight, g		Velocity, m/s		Frequency, Hz		Modulus of rupture after 300 cycles, MPa
			Initial	Final	Initial	Final	Initial	Final	
Granite	1	1	3340	3340	5190	5423	9100	9900	11.2
		2	3204	3205	5216	5481	9400	9500	10.9
	10	1	3376	3377	5486	5577	10400	11800	18.1
		2	3213	3214	5541	5601	9100	10700	16.3
	12	1	3309	3308	5949	6000	12700	12300	16.7
		2	3470	3470	5824	5891	12500	12600	17.8
	13	1	3367	3369	5994	6175	13000	12000	18.3
		2	3250	3250	5965	6070	11900	10500	17.1
	52	1	3283	3282	5476	5535	9000	10200	12.1
		2	3044	3044	5526	5556	8900	8700	15.9
	82	1	3205	3205	5413	5470	9300	10000	12.2
		2	3213	3213	5714	5475	8800	8200	11.4
Marble	29	1	3312	3312	6078	6152	12900	13200	10.7
		2	3488	3487	6119	6250	13200	13200	11.8
	31	1	3445	3444	6551	6592	9200	9900	8.1
		2	3365	3365	6404	6527	9800	9400	9.0
	71	1	3228	3228	5674	6030	9000	9300	6.8
		2	3248	3250	5000	5577	9400	10400	5.2

APPENDIX II

ASTM TEST SPECIFICATIONS

Standard Test Methods for

ABSORPTION AND BULK SPECIFIC GRAVITY OF NATURAL BUILDING STONE[1]

This standard is issued under the fixed designation C 97; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

$^{\epsilon 1}$ Note—Section 4.1 was corrected editorially in May 1985.

1. Scope

1.1 These test methods cover the tests for determining the absorption and bulk specific gravity of all types of natural building stone, except slate.

1.2 The values stated in inch-pound units are to be regarded as the standard.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Significance and Use

2.1 These test methods are useful in indicating the differences in absorption between the various building stones. These test methods also provide one element in comparing stones of the same type.

ABSORPTION

3. Sampling

3.1 The sample shall be selected to represent a true average of the type or grade of stone under consideration and shall be of the quality supplied to the market under the type designation to be tested. The sample may be selected by the purchaser or his authorized representative from the quarried stone or taken from the natural ledge and shall be of adequate size to permit the preparation of at least three test specimens. When perceptible variations occur, the purchaser may select as many samples as are necessary for determining the range in properties.

4. Test Specimens

4.1 The specimens may be cubes, prisms, cylinders, or any regular form with least dimension not under 2 in. (50.8 mm) and greatest dimension not over 3 in., (76.2 mm) but the ratio of volume to surface area shall be not less than 0.3 in. (7.6 mm) nor greater than 0.5 in. (12.7 mm). All surfaces shall be reasonably smooth. Saw or core drill surfaces are considered satisfactory, but rougher surfaces shall be finished with No. 80 abrasive. No chisels or similar tools shall be used at any stage of preparing the specimens. At least three specimens shall be prepared from each sample.

5. Procedure

5.1 Dry the specimens for 24 h in a ventilated oven at a temperature of 105 ± 2°C (221 ± 3.6°F).

5.2 After drying, cool the specimens in the room for 30 min and weigh. When the specimens cannot be weighed immediately after cooling, store them in a desiccator. Determine the weights to the nearest 0.02 g.

5.3 Immerse the specimens completely in filtered or distilled water at 20 ± 5°C (68 ± 9°F) for 48 h. At the end of this period remove them from the water bath one at a time, surface dry with a damp cloth, and weigh to the nearest 0.02 g.

6. Calculations and Report

6.1 Calculate the weight percentage absorption (Note 1) for each specimen as follows:

$$\text{Absorption, weight \%} = [(B - A)/A] \times 100$$

where:

A = weight of the dried specimen, and
B = weight of the specimen after immersion.

Note 1—If the percentage of absorption by volume is desired it will be necessary to determine the bulk specific gravity and multiply each value of percentage absorption by weight by the corresponding bulk specific gravity value.

6.2 Report the average of all the specimens from each sample as the absorption of the sample. The report shall state the highest and lowest values and the average.

BULK SPECIFIC GRAVITY

7. Samples and Test Specimens

7.1 Samples may be the same as those used for absorption, or other samples may be selected in accordance with Section 3. At least three test specimens from each sample shall be tested, and they shall conform to the requirements of Section 4 as to size, shape, and preparation.

8. Procedure

8.1 When both absorption and bulk specific gravity are to be determined on the same specimens, weigh the saturated specimens suspended in filtered or distilled water at 20 ± 5°C (68 ± 9°F) immediately after the absorption tests are completed. Determine the suspended weights to the nearest 0.02 g. A satisfactory means of weighing specimens in water is to use a basket, similar to that illustrated in Fig. 1, for suspending the specimens in a glass jar of water supported above the balance pan. Determine the weight of the basket when suspended in water to the same depth as when weighing specimens therein. Subtract the weight of the basket to the nearest 0.02 g from the combined weight of the specimen and basket. Carefully remove air bubbles clinging to the basket or specimen before recording the weight.

8.2 When the bulk specific gravity test is made on specimens other than those used for absorption, determine the dry weights as in 5.1 and 5.2. Immerse the specimens in filtered or distilled water at 20 ± 5°C (68 ± 9°F) for at least 1 h or until air bubbles do not form on the specimens within 5 min. Surface dry the specimens as in 5.3, weigh to the nearest 0.02 g, and return to the water bath. Determine the weights in water before the specimens have stood in the water more than 5 min.

9. Calculations and Report

9.1 Calculate the bulk specific gravity as follows:

$$\text{Bulk specific gravity} = A/(B - C)$$

where:

A = weight of the dried specimen,
B = weight of the soaked and surface-dried specimen in air, and
C = weight of the soaked specimen in water.

9.2 Calculate the results to three decimal places and round off to two. Report the average, maximum, and minimum values.

Note 2—The bulk specific gravity gives a convenient and accurate means of calculating the unit weight of the stone; for example, weight per cubic foot (cubic metre) (dry stone) = bulk specific gravity × 62.4.

10. Precision and Bias

10.1 Individual variations in a natural product may result in deviation from accepted values. A precision section will be added when sufficient data are available to indicate in repeatability and reproducibility.

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[1] These test methods are under the jurisdiction of ASTM Committee C-18 on Natural Building Stones and are the direct responsibility of Subcommittee C18.01 on Test Methods.

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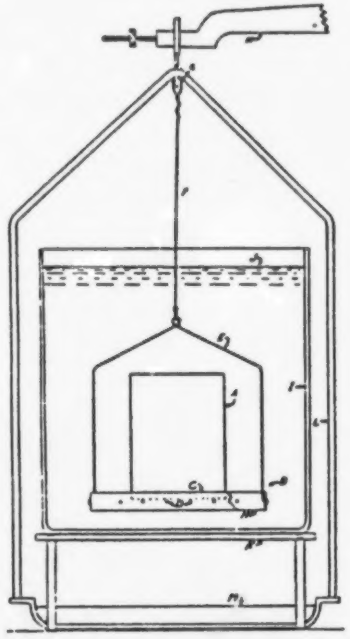

A—Specimen.
B—Suspension basket
C—Brass ring.
D—Bottom of basket of No. 13 B & S gage (1.83 mm) brass wire (all joints soldered).
E—Bail of basket of No. 13 B & S gage (1.83 mm) brass wire
F—Suspension wire of No. 20 B & S gage (0.812 mm) brass wire.
G—Loop for attachment to stirrup of balance
H—Cutaway section of basket.
I—Water jar
J—Water level.
K—Water jar support.
L—Balance pan suspension rod.
M—Balance pan.
N—Beam of balance.

FIG. 1 Bulk Specific Gravity Test Assembly

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Designation: C 241 - 85

Standard Test Method for
ABRASION RESISTANCE OF STONE SUBJECTED TO FOOT TRAFFIC[1]

This standard is issued under the fixed designation C 241; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the abrasion resistance of all types of stones for floors, steps, and similar uses where the wear is caused by the abrasion of foot traffic.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Applicable Document

2.1 *ASTM Standard:*
C 97 Test Methods for Absorption and Bulk Specific Gravity of Natural Building Stone[2]

3. Significance and Use

3.1 This test method is useful in indicating the differences in abrasion resistance between the various building stones. This test method also provides one element in comparing stones of the same type.

4. Apparatus

4.1 The abrasion testing apparatus shown in Fig. 1 shall be used. This apparatus consists essentially of a power-driven grinding lap, *A*, 10 in. (254 mm) in diameter, which is revolved at 45 rpm; three specimen holders, *B*, with superimposed weights; gears, *C*, for revolving the specimen; and a means of feeding abrasive at a constant rate to the lap. The guide rings, *D*, are clamped in position slightly above the specimen holders, and the 2000-g weight bearing on the specimen is the combined weight of the specimen holder, vertical shaft above with the attached spur gear, and a weight hopper, *E*, containing additional adjustment weights. The frame, *F*, carrying the guide rings is adjustable vertically to accommodate different specimen thicknesses. Gears, *C*, are adjusted on the shafts for each specimen thickness, so that they are slightly above the plate, *G*, throughout the test.

5. Sampling

5.1 The sample may be selected by the purchaser or his authorized agent but shall represent the average quality of the type or grade of stone under consideration. It shall be of sufficient size to permit the preparation of at least three test specimens, and one face should have the finish to be exposed to traffic. The sample preferably should be 1 in. (25.4 mm) thick and 8 in. (203.2 mm) square.

6. Test Specimens

6.1 At least three specimens 2 in. (50.8 mm) square and preferably 1 in. (25.4 mm) in thickness shall be sawed from the sample. The sharp edges shall be rounded by grinding to a radius of approximately $^1/_{32}$ in. (0.8 mm) in order to prevent crumbling during the test.

7. Conditioning

7.1 Dry the test specimens in an oven at 105

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[1] This test method is under the jurisdiction of ASTM Committee C-18 on Natural Building Stones and is the direct responsibility of Subcommittee C18.01 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 04.08.

± 2°C for 24 h. If the test is to be made immediately after the specimens have cooled, it is not necessary to place them in a desiccator.

8. Procedure

8.1 Weigh the test specimens to the nearest 0.01 g; then place them in the abrasion testing apparatus and abrade for 225 revolutions of the grinding lap with No. 60 Alundum abrasive (Norton treatment 138S). Remove the specimens from the apparatus, brush them free of dust, and weigh to the same precision as for the original weights.

8.2 Place the specimens in water for an hour or more, surface dry them with a towel, and weigh again. Weigh the specimens in water and calculate the bulk specific gravity as described in Test Methods C97.

NOTE 1—Humidity affects the results to some extent in that the rate of grinding is higher for higher humidity. For this reason it is advisable to make the test when the relative humidity is between 30 and 40 %.

9. Calculation

9.1 Calculate the abrasion resistance of each specimen as follows (Note 2):

$$H_a = 10G(2000 + W_s)/2000 W_a$$

where:

G = bulk specific gravity of the sample,

W_s = average weight of the specimen (original weight plus final weight divided by 2), and

W_a = loss of weight during the grinding operation.

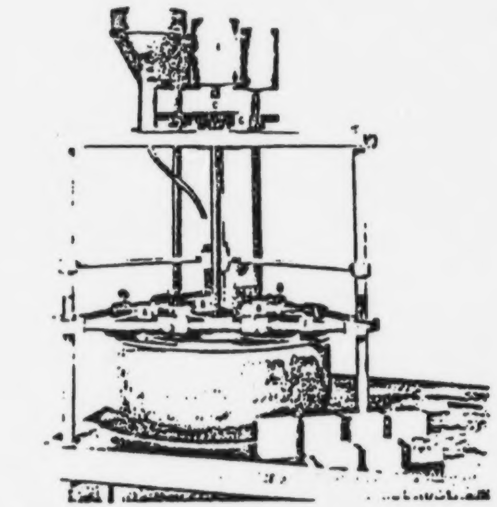
NOTE 2—The abrasive hardness value, H_a, is the reciprocal of the volume of material abraded multiplied by ten. The superimposed weight on the specimen is 2000 g and this is augmented by the weight of the specimen itself. The correction for the weight of the specimen, included in the formula, is based on the fact that the rate of abrasion is directly proportional to the weight. By basing the abrasive resistance values on the volumes, rather than the weights abraded, a better comparison is obtained for materials that vary considerably in bulk density.

10. Report

10.1 The average of the tests on individual specimens, expressed to two significant figures, shall be reported as the abrasive resistance of the sample, but all results shall be reported as information. The report shall identify the type and grade of stone, its source, and the approximate date of removal from the quarry.

11. Precision and Bias

11.1 Individual variations in a natural product may result in deviation from accepted values. A precision section will be added when sufficient data are available to indicate acceptable tolerances in repeatability and reproducibility.



A— Grinding lap.
B— Specimen holders.
C— Gears.
D— Guide rings.
E— Weight hopper.
F— Frame.
G— Plate.

FIG. 1 Apparatus for Abrasion Resistance Test of Stone

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Designation: C 99 - 85

Standard Test Method for
MODULUS OF RUPTURE OF NATURAL BUILDING STONE[1]

This standard is issued under the fixed designation C 99; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the modulus of rupture of all types of natural building stone except slate.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Significance and Use

2.1 This test method is useful in indicating the differences in modulus of rupture between the various building stones. This test method also provides one element in comparing stones of the same type.

3. Apparatus

3.1 *Testing Machine*—The accuracy of the testing machine shall be within 1 % for the range from 10 to 1000 lbf (44 to 4450 N).

3.2 *Knife Edges*—The supports for the specimen shall be two knife edges of the rocker type (Fig. 1) with edges at least as long as the width of the specimen. The loading knife edge may be of either the rocker or rigid type.

4. Sampling

4.1 Select the sample to represent a true average of the type or grade of stone under consideration and of the quality supplied to the market under the type designation to be tested. The sample may be selected by the purchaser or his authorized representative from the quarried stone or taken from the natural ledge and shall be of adequate size to permit the preparation of the desired number of test specimens. When perceptible variations occur, the purchaser may select as many samples as are necessary for determining the variations in modulus of rupture.

5. Test Specimens

5.1 The specimens shall be approximately 4 by 8 by 2¼ in. (101.6 by 203.2 by 57.2 mm) in size, and three or more shall be prepared for each desired condition of loading. They shall be sawed from the sample and finished by grinding to smooth surfaces. The 4 by 8-in. faces shall be as nearly plane and parallel as practicable. For loading perpendicular to the rift (Note 1) five specimens shall be prepared with the 4 by 8-in. face parallel to the rift planes (see A_1 in Fig. 1), and for loading parallel to the rift, five specimens shall be prepared with the 4 by 2¼-in. (101.6 by 57.2 mm) faces parallel to the rift (Note 2). When tests are desired on the stone in both the wet and dry condition, ten specimens shall be prepared for each direction of loading; that is, five for tests dry, perpendicular to the rift, five for tests wet, perpendicular to the rift, etc.

NOTE 1—The term rift is used here to designate the direction in which the stone splits most easily. In stratified stones it is considered to coincide with the bedding or stratification. The rift direction should always be marked on the sample by the quarryman, since it often is not possible to determine it on a small block.

NOTE 2—Another condition of loading may occur in structures when the rift planes are vertical and parallel to the length of the beam. The strength of the stone may be obtained for such loading by cutting the specimens with the 2¼ by 8-in. (57.2 by 203.2-mm) face parallel to the rift. The meager data available for this condition of loading indicates that the strength is at least as high as when the load is applied perpendicular to the rift as shown by A_1 in Fig. 1.

6. Marking and Measuring Specimens

6.1 On the 4 by 8-in. (101.6 by 203.2-mm) face draw the center line perpendicular to one edge (8 by 2¼-in. (203.2 by 57.2-mm) face) and extend down both edges perpendicular to the 4 by 8-in. face. At a distance of 3.5 in. (88.9 mm) each way from the center line, draw two similar sets of lines (span lines, "*a*" in Fig. 1). Mark each specimen to indicate the direction of the rift and label with suitable numbers or letters for identification in measuring and testing.

6.2 Measure the dimensions of the cross section on the center line. Measure the width to the nearest 0.01 in. (0.25 mm) and take the thickness as the average of three measurements to the nearest 0.01 in., one taken at the center and one near each edge.

7. Conditioning

7.1 Before testing the specimens for dry strength, dry them for 24 h at 105 ± 2°C (221 ± 3.6°F). Before testing the specimens for wet strength, immerse them for 48 h in water at 25 ± 5°C (77 ± 9°F).

8. Procedure

8.1 Lay the specimen flatwise on the supporting knife edges, spaced 7 in. (177.8 mm) apart and equidistant from the loading knife edges (Note 3), with all three knife edges parallel. When a load of 10 lbf (44 N) has been applied, stop the loading and make all knife edges coincide with the marks on the specimen by centering the specimen under the loading edge and moving the supporting edges under the span marks. Apply the loading at a rate not exceeding 1000 lbf/min (4450 N/min) until failure of the specimen.

NOTE 3—When all three knife edges are of the rocker type, care must be taken to adjust all three until the top face of the specimen is horizontal when loaded.

9. Calculation

9.1 Calculate the modulus of rupture of each specimen as follows:

$$R = 3Wl/2bd^2$$

where:

R = modulus of rupture, psi (or MPa),
W = breaking load, lbf (or N),
l = length of span, in. (or mm),
b = width of specimen, in. (or mm), and
d = thickness of specimen, in. (or mm).

10. Report

10.1 Report the average of all values of modulus of rupture for test specimens loaded perpendicular to the rift as the modulus of rupture perpendicular to the rift, and report the average for all test specimens loaded parallel to the rift as the modulus of rupture parallel to the rift. In case any specimen gives a value of as much as 20 % under the average it shall be examined for defects and, if the low value appears to be due to a flaw or faulty test piece, report the average of the remaining specimens of the group as the modulus of rupture of the sample for the condition of loading under consideration. Report all determinations as information.

10.2 Report the following additional information:

10.2.1 Identification of the sample, including the name and location of the quarry, name and position of the ledge, date when sample was taken, and trade name or grade of the stone,

10.2.2 Size and shape of specimens used in the test, and

10.2.3 A description of the way in which the specimens were prepared.

11. Precision and Bias

11.1 Individual variations in a natural product may result in deviation from accepted values. A precision section will be added when sufficient data are available to indicate acceptable tolerances in repeatability and reproducibility.

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[1] This test method is under the jurisdiction of ASTM Committee C-18 on Natural Building Stones and is the direct responsibility of Subcommittee C18.01 on Test Methods.

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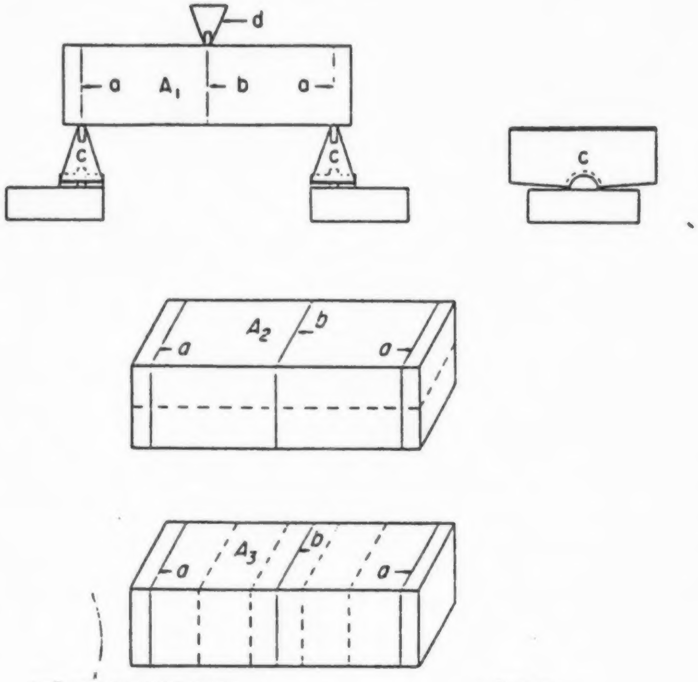

A_1—Specimen in position for testing.
A_2—Specimen for test perpendicular to the rift.
A_3—Specimen for test parallel to the rift.
(Dotted lines on A_2 and A_3 indicate the rift direction)

a— Span lines.
b— Center lines.
c— Supporting knife edges.
d— Loading knife edge.

FIG. 1 Specimens and Preferred Type of Knife Edges for Determining the Modulus of Rupture of Building Stone

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Designation: C 170 - 85

Standard Test Method for
COMPRESSIVE STRENGTH OF NATURAL BUILDING STONE[1]

This standard is issued under the fixed designation C 170; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the sampling, preparation of specimens, and determination of the compressive strength of natural building stone.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Applicable Document

2.1 *ASTM Standard:*

E 4 Practices for Load Verification of Testing Machines[2]

3. Significance and Use

3.1 This test method is useful in indicating the differences in compressive strength between the various building stones. This test method also provides one element in comparing stones of the same type.

4. Apparatus

4.1 Any testing machine conforming Practices E 4 and to the speed of testing requirements prescribed in Section 8 of this test method may be used.

4.2 In vertical testing machines, the spherical bearing block shall be suspended from the upper head of the machine in such a manner that the contact plate remains in a central position (spherical surfaces in full contact) when not loaded. The spherical surfaces shall be well lubricated, and the center of curvature shall lie in the surface of contact with the specimen.

5. Sampling

5.1 The sample shall be selected to represent a true average of the type or grade of stone under consideration and shall be of the quality supplied to the market in finished form under the type designation to be tested. The sample may be selected by the purchaser or his authorized representative from quarried stone or taken from the natural ledge and shall be of adequate size to permit the preparation of the desired number of test specimens. When perceptible variations occur, the purchaser may select as many samples as are necessary for determining the variation in compressive strength.

6. Test Specimens

6.1 The test specimens may be cubes, square prisms, or cylinders and shall be cut from the sample with saws or core drills. The diameter or lateral dimension (distance between opposite vertical faces) shall be not less than 2 in. (50.8 mm) (Explanatory Note 1), and the ratio of height (Explanatory Note 2) to diameter or lateral dimension should be not less than 1:1. At least five specimens shall be prepared for each condition of the test; that is, when the compressive strength is desired for the wet and dry conditions but in only one direction, such as perpendicular to the bed (or rift) (see Fig. 1(*a*)), ten specimens will be required. For wet and dry strength tests both perpendicular and parallel to the bed (or rift) (see Fig. 1(*a*) and (*b*)), twenty specimens are required (Explanatory Note 3). The load-bearing faces shall be finished by grinding to as nearly true and parallel planes (Explanatory Note 4) as practicable.

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[1] This test method is under the jurisdiction of ASTM Committee C-18 on Natural Building Stones and is the direct responsibility of Subcommittee C18.01 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 03.01.

6.2 The load-bearing surfaces and the direction of bedding (or rift) shall be marked on each specimen after finishing.

6.3 The load-bearing areas of the specimen shall be calculated from measurements taken midway between the load-bearing surfaces. The dimensions of the specimens shall be measured to the nearest 0.02 in. (0.5 mm) and the load-bearing areas calculated to the nearest 0.04 in.^{2} (0.26 cm^2).

7. Conditioning

7.1 *Dry Condition*—Dry specimens to be tested in the dry condition at 221 ± 3.6°F (105 ± 2°C) for 24 h.

7.2 *Wet Condition*—Immerse specimens to be tested in the wet condition in water at 68 ± 9°F (20 ± 5°C) for 48 h and test immediately after removal from the water bath.

8. Procedure

8.1 Center the specimens in the testing machine and apply the initial load at a rate that will permit hand adjustment of the contact plate on the specimen. Rotate the plate back and forth through an angle of about 30° under a small load to properly seat the spherical block, but take care not to move the specimen out of the central position. Preferably, the rate of loading should not exceed 100 psi (690 kPa)/s, but this requirement may be considered as being met if the speed of the loading head is not more than 0.05 in. (1.3 mm)/min.

9. Calculations

9.1 Calculate the compressive strength of each specimen as follows:

$$C = W/A$$

where:

C = compressive strength of the specimen, psi (MPa)

W = total load, lbf (N), on the specimen at failure, and

A = calculated area of the bearing surface in in.^{2} (mm^2).

Round each individual result to the nearest 100 psi (1 MPa).

9.2 When the ratio of height to diameter (or lateral dimension) differs from unity by 25 % or more, calculate the result to that of the corresponding cube, as follows:

$$C_c = C_p/[0.778 + 0.222(b \div h)]$$

where:

C_c = compressive strength of an equivalent cubical specimen,

C_p = compressive strength of the specimen having a height greater than the diameter or lateral dimension,

b = diameter or lateral dimension, and

h = height.

10. Report

10.1 The average compressive strength of all specimens loaded as shown in Fig. 1(*a*) shall be reported as the compressive strength perpendicular to the bedding (or rift), and the average compressive strength of all specimens loaded as shown in Fig. 1(*b*) shall be reported as the compressive strength parallel to the bedding (or rift).

10.2 The following additional information shall be reported:

10.2.1 Identification of the sample, including name and location of the quarry, name or position of the ledge, date when sample was taken and trade name or grade of stone,

10.2.2 Size and shape of specimens used in the tests, and

10.2.3 A description of the way in which the specimens were prepared.

11. Precision and Bias

11.1 Individual variations in a natural product may result in deviation from accepted values. A precision section will be added when sufficient data are available to indicate acceptable tolerances in repeatability and reproducibility.

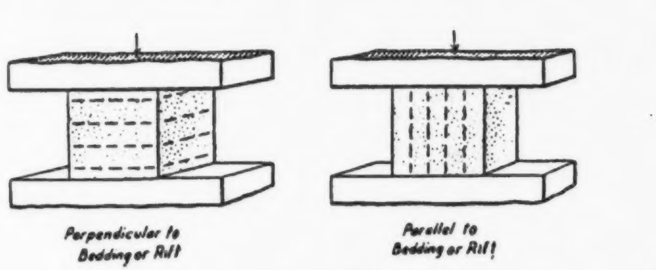
EXPLANATORY NOTES

NOTE 1—For very coarse-grain materials like some of the granites, the diameter of the specimen should not be less than 2.5 in. (63.5 mm).

NOTE 2—The height of the specimen is considered as the distance between the load-bearing faces.

NOTE 3—In some materials, such as granite, three directions with respect to fissility are recognized, as follows: "rift" (the plane of easiest splitting), "grain" (the plane of next easiest splitting), and "head-grain" (the plane of hardest splitting). Occasionally, tests are required for determining the strength perpendicular to each of these directions. In such cases, the sample shall be marked at the quarry to show which faces are grain, rift, and head-grain, and the required number of specimens shall be prepared with load-bearing faces parallel to each of these planes and properly labeled for the various tests.

NOTE 4—Accuracy of test results depends largely on uniform distribution of the load over the bearing faces. In order to grind the surfaces to reasonably true planes, considerable care is necessary. The following procedure is suggested: Assuming that the specimen is a rectangular prism and the load is to be applied to the ends, mark two adjacent sides for reference, then grind the ends on a grinding wheel or lap until they are perpendicular to these reference sides as gaged by a try square. Complete the grinding by rubbing the ends on a smooth machine-planed surface of a cast iron plate with No. 80 emery and water. The specimen should be grasped as near the surface of the plate as possible to prevent rocking of the specimen. A suitable way to determine when the surfaces are reasonably plane is to dip the specimen in water and press the ends on a smooth machine-planed and polished surface of a 10-lb (4.5-kg) weight. If the weight can be lifted by raising the specimen, the surfaces may be considered to be sufficiently accurate. A satisfactory mechanical means of finishing the bearing surfaces of the specimens is to place them in a chuck in a lathe and surface the ends with a tool post grinder. This grinder consists of a small motor and arbor carrying an abrasive wheel which turns at about 5000 rpm. A three-point chuck is used to permit the surfacing of cylindrical, square prism, or cubical specimens. When the square-type specimen is used it will be necessary to place a small piece of notched metal between the specimen and one chuck point. This causes the specimen to be placed somewhat off-center but does not interfere with the surfacing process. The surface can be tested for planeness by holding a straightedge on the surface and viewing it before a strong light. Specimens finished in this way commonly give considerably higher test results than specimens prepared by hand.



Dashed lines indicate direction of bedding or rift.
Arrows indicate direction of loading.

NOTE—Dashed lines indicate direction of bedding or rift. Arrows indicate direction of loading.

(*a*) Loading Perpendicular to Bedding or Rift

(*b*) Loading Parallel to Bedding or Rift

FIG. 1 Methods of Applying Load with Reference to Bedding or Rift

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Designation: C 880 - 85

Standard Test Method for
FLEXURAL STRENGTH OF NATURAL BUILDING STONE[1]

This standard is issued under the fixed designation C 880; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the procedure for determining the flexural strength of stone by use of a simple beam using quarter-point loading.

1.2 Stone tests shall be made when pertinent for the situation when the load is perpendicular to the bedding plane and when the load is parallel to the bedding plane.

1.3 As required, the flexural tests shall also be conducted under wet conditions.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Applicable Document

2.1 *ASTM Standard:*

E 4 Practices for Load Verification of Testing Machines[2]

3. Significance and Use

3.1 This test method is useful in indicating the differences in flexural strength between the various building stones. This test method also provides one element in comparing stones of the same type.

4. Apparatus

4.1 *Testing Machine* (Fig. 1), conforming to the requirements of the applicable sections of Practices E 4. The quarter-point loading method shall be used in making flexure tests of stone employing bearing blocks which will ensure that forces applied to the beam will be vertical only and applied without eccentricity. The apparatus should be capable of maintaining the span length and distances between load-applying blocks and support blocks constant within ±1.3 mm (±0.05 in.). The load should be capable of being applied at a uniform rate and in such a manner as to avoid shock.

5. Test Specimens

5.1 The test specimens shall have a span as nearly as practicable 10 times its depth as tested and a width 1.5 times its depth. The minimum depth of the specimen shall be 25 mm (1 in.). A recommended specimen size is 38 mm (1½ in.) wide by 25 mm (1 in.) thick by 300 mm (12 in.) long. The sides of the specimen shall be at right angles with the top and bottom. The specimens shall have a fine abrasive finish on the planes perpendicular to the load and a fine saw finish on the other four planes. The dimensions of the specimen shall be measured and recorded to the nearest 0.3 mm (0.01 in.). A minimum of five specimens shall be tested.

5.2 Test results obtained by this test method are those of flexural strength properties. In specific applications, test specimens of different geometry may give useful results in terms of a modulus of rupture value.

6. Preconditioning of Specimens

6.1 Uniformly heat specimens to be tested dry at 50 ± 1°C for 24 h and cool at room temperature in a desiccator for 48 h prior to testing.

6.2 Immerse specimens to be tested wet in water at 20 ± 1°C for 48 h and test immediately upon removal from the bath after wiping the specimen free of surface water.

7. Procedure

7.1 Assemble the apparatus and place the specimen on the span supports and adjust the quarter point loading blocks into contact with the specimen.

7.2 Then increase the load at 535 N/min (120 lbf/min), which corresponds to a stress rate of 4.14 MPa (600 psi)/min, a deflection rate of 0.015 mm (0.0006 in.)/min, and a crosshead movement of 0.6 mm (0.025 in.)/min. Apply the load to failure at a rate of 69 kPa (10 psi)/s.

8. Calculation

8.1 Calculate the flexural strength, σ, as follows:

$$\sigma = \frac{3}{4}\frac{WL}{bd^2}$$

where:

σ = flexural strength, MPa (psi),
W = maximum load, N (lbf),
L = span, mm (in.); $L = 10d$,
b = width of specimen, mm (in.); $b = 1.5d$, and
d = depth of specimen, mm (in.).

9. Report

9.1 The report shall include the following:

9.1.1 Stone type.

9.1.2 Sizes of the specimens used.

9.1.3 Preconditioning procedure used.

9.1.4 Individual test results for each specimen.

9.1.5 Average value of the test results for each group using the following relation:

$$\bar{x} = \frac{\text{sum of observed values}}{\text{number of tests}}$$

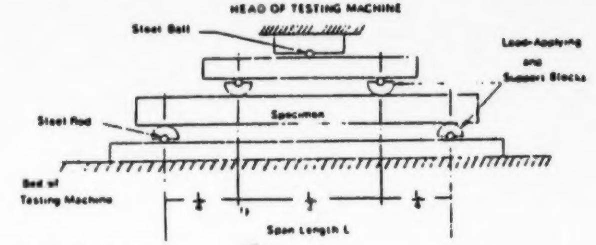
9.1.6 Standard deviation, s, of the test results for each group using the following relation:

$$s = \frac{\sqrt{\text{sum of (observed value} - \bar{x})^2}}{\text{number of tests} - 1}$$

9.1.7 Any variations from the above procedural techniques.

10. Precision and Bias

10.1 Individual variations in a natural product may result in deviation from accepted values. A precision section will be added when sufficient data are available to indicate acceptable tolerances in repeatability and reproducibility.



NOTE—Apparatus may be used inverted

FIG. 1 Diagrammatic View of a Suitable Apparatus for Flexure Test of Stone

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[1] This test method is under the jurisdiction of ASTM Committee C-18 on Natural Building Stones and is the direct responsibility of Subcommittee C18.01 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 03.01.

Designation: C 666 – 84

Standard Test Method for
RESISTANCE OF CONCRETE TO RAPID FREEZING AND THAWING[1]

This standard is issued under the fixed designation C 666; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This method has been approved for use by agencies of the Department of Defense and for listing in the DoD Index of Specifications and Standards.

1. Scope

1.1 This test method covers the determination of the resistance of concrete specimens to rapidly repeated cycles of freezing and thawing in the laboratory by two different procedures: Procedure A, Rapid Freezing and Thawing in Water, and Procedure B, Rapid Freezing in Air and Thawing in Water. Both procedures are intended for use in determining the effects of variations in the properties of concrete on the resistance of the concrete to the freezing-and-thawing cycles specified in the particular procedure. Neither procedure is intended to provide a quantitative measure of the length of service that may be expected from a specific type of concrete.

1.2 The values stated in inch-pound units are to be regarded as the standard.

1.3 All material in this test method not specifically designated as belonging to Procedure A or Procedure B applies to either procedure.

1.4 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Applicable Documents

2.1 *ASTM Standards:*

C 157 Test Method for Length Change of Hardened Cement Mortar and Concrete[2]

C 192 Method of Making and Curing Concrete Test Specimens in the Laboratory[2]

C 215 Test Method for Fundamental Transverse, Longitudinal, and Torsional Frequencies of Concrete Specimens[2]

C 233 Method of Testing Air-Entraining Admixtures for Concrete[2]

C 341 Test Method for Length Change of Drilled or Sawed Specimens of Cement Mortar Concrete[2]

C 490 Specification for Apparatus for Use in Measurement of Length Change of Hardened Cement Paste, Mortar, and Concrete[2]

C 494 Specification for Chemical Admixtures for Concrete[2]

C 670 Practice for Preparing Precision Statements for Test Methods for Construction Materials[2]

C 823 Practice for Examination and Sampling of Hardened Concrete in Constructions[2]

3. Significance and Use

3.1 As noted in the scope, the two procedures described in this test method are intended to determine the effects of variations in both properties and conditioning of concrete in the resistance to freezing and thawing cycles specified in the particular procedure. Specific applications include specified use in Specification C 494, Method C 233, and ranking of coarse aggregates as to their effect on concrete freeze-thaw durability, especially where soundness of the aggregate is questionable.

3.2 It is assumed that the procedures will have no significantly damaging effects on frost-resistant concrete which may be defined as (*1*) any concrete not critically saturated with water (that is, not sufficiently saturated to be damaged by freezing) and (*2*) concrete made with frost-resistant aggregates and having an adequate air-void system that has achieved appropriate maturity and thus will prevent critical saturation by water under common conditions.

3.3 If as a result of performance tests as described in this test method concrete is found to be relatively unaffected, it can be assumed that it was either not critically saturated, or was made with "sound" aggregates, a proper air-void system, and allowed to mature properly.

3.4 No relationship has been established between the resistance to cycles of freezing and thawing of specimens cut from hardened concrete and specimens prepared in the laboratory.

4. Apparatus

4.1 *Freezing-and-Thawing Apparatus:*

4.1.1 The freezing-and-thawing apparatus shall consist of a suitable chamber or chambers in which the specimens may be subjected to the specified freezing-and-thawing cycle, together with the necessary refrigerating and heating equipment and controls to produce continuously, and automatically, reproducible cycles within the specified temperature requirements. In the event that the equipment does not operate automatically, provision shall be made for either its continuous manual operation on a 24-h a day basis or for the storage of all specimens in a frozen condition when the equipment is not in operation.

4.1.2 The apparatus shall be so arranged that, except for necessary supports, each specimen is: (*1*) for Procedure A, completely surrounded by not less than 1/32 in. (1 mm) nor more than 1/8 in. (3 mm) of water at all times while it is being subjected to freezing-and-thawing cycles, or (*2*) for Procedure B, completely surrounded by air during the freezing phase of the cycle and by water during the thawing phase. Rigid containers, which have the potential to damage specimens, are not permitted. Length change specimens in vertical containers shall be supported in a manner to avoid damage to the gage studs.

NOTE 1—Experience has indicated that ice or water pressure, during freezing tests, particularly in equipment that uses air rather than a liquid as the heat transfer medium, can cause excessive damage to rigid metal containers, and possibly to the specimens therein. Results of tests during which bulging or other distortion of containers occurs should be interpreted with caution.

Each specimen should be supported at the bottom of its container in such a way that the temperature of the heat-exchanging medium will not be transmitted directly through the bottom of the container to the full area of the bottom of the specimen, thereby subjecting it to conditions substantially different from the remainder of the specimen. A flat spiral of 1/8-inch. (3-mm) wire placed in the bottom of the container has been found adequate for this purpose.

NOTE 2—For Procedure B, it is not contemplated that the specimens will be kept in containers. The supports on which the specimens rest should be such that they are not in contact with the full area of the supported side or end of the specimen, thereby subjecting this area to conditions substantially different from those imposed on the remainder of the specimen.

4.1.3 The temperature of the heat-exchanging medium shall be uniform within 6°F (3.3°C) throughout the specimen cabinet when measured at any given time, at any point on the surface of any specimen container for Procedure A or on the surface of any specimen for Procedure B, except during the transition between freezing and thawing and *vice versa*.

4.1.3.1 Support each specimen at the bottom of its container in such a way that the temperature of the heat-exchanging medium will not be transmitted directly through the bottom of the container to the full area of the bottom of the specimen, thereby subjecting it to conditions substantially different from the remainder of the specimen.

NOTE 3—A flat spiral of 1/8-in. (3-mm) wire placed in the bottom of the container has been found adequate for supporting specimens.

4.1.4 For Procedure B, it is not contemplated that the specimens will be kept in containers. The supports on which the specimens rest shall be such that they are not in contact with the full area of the supported side or end of the specimen, thereby subjecting this area to conditions substantially different from those imposed on the remainder of the specimen.

NOTE 4—The use of relatively open gratings, metal rods, or the edges of metal angles has been found adequate for supporting specimens, provided the heat-exchanging medium can circulate in the direction of the long axis of the rods or angles.

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[1] This test method is under the jurisdiction of ASTM Committee C-9 on Concrete and Concrete Aggregates and is the direct responsibility of Subcommittee C09.03.15 on Methods of Testing Concrete for Resistance to Weathering.

Current edition approved May 25, 1984. Published July 1984. Originally published as C 666 – 71. Last previous edition C 666 – 80.

[2] *Annual Book of ASTM Standards*, Vol 04.02.

4.2 *Temperature-Measuring Equipment*, consisting of thermometers, resistance thermometers, or thermocouples, capable of measuring the temperature at various points within the specimen chamber and at the centers of control specimens to within 2°F (1.1°C).

4.3 *Dynamic Testing Apparatus*, conforming to the requirements of Test Method C 215.

4.4 *Optional Length Change Test Length Change Comparator*, conforming to the requirements of Specification C 490. When specimens are longer than the nominal 11¼ in. (286 mm) length provided for in Specification C 490 used for freeze-thaw tests, use an appropriate length reference bar, which otherwise meets the Specification C 490 requirements. Dial gage micrometers for use on these longer length change comparators shall meet the gradation interval and accuracy requirements for Specification C 490 for either the inch or millimetre calibration requirements. Prior to the start of measurements on any specimens, fix the comparator at an appropriate length to accommodate all of the specimens to be monitored for length change.

4.5 *Scales*, with a capacity approximately 50 % greater than the weight of the specimens and accurate to at least 0.01 lb (4.5 g) within the range of ±10 % of the specimen weight will be satisfactory.

4.6 *Tempering Tank*, with suitable provisions for maintaining the temperature of the test specimens in water, such that when removed from the tank and tested for fundamental transverse frequency and length change, the specimens will be maintained within −2°F and +4°F (−1.1°C and +2.2°C) of the target thaw temperature for specimens in the actual freezing-and-thawing cycle and equipment being used. The use of the specimen chamber in the freezing-and-thawing apparatus by stopping the apparatus at the end of the thawing cycle and holding the specimens in it shall be considered as meeting this requirement, provided the specimens are tested for fundamental transverse frequency within the above temperature range. It is required that the same target specimen thaw temperature be used throughout the testing of an individual specimen since a change in specimen temperature at the time of length measurement can affect the length of the specimen significantly.

5. Freezing-and-Thawing Cycle

5.1 Base conformity with the requirements for the freezing-and-thawing cycle on temperature measurements of control specimens of similar concrete to the specimens under test in which suitable temperature-measuring devices have been imbedded. Change the position of these control specimens frequently in such a way as to indicate the extremes of temperature variation at different locations in the specimen cabinet.

5.2 The nominal freezing-and-thawing cycle for both procedures of this test method shall consist of alternately lowering the temperature of the specimens from 40 to 0°F (4.4 to −17.8°C) and raising it from 0 to 40°F (−17.8 to 4.4°C) in not less than 2 nor more than 5 h. For Procedure A, not less than 25 % of the time shall be used for thawing, and for Procedure B, not less than 20 % of the time shall be used for thawing (Note 2). At the end of the cooling period the temperature at the centers of the specimens shall be 0 ± 3°F (−17.8 ± 1.7°C), and at the end of the heating period the temperature shall be 40 ± 3°F (4.4 ± 1.7°C), with no specimen at any time reaching a temperature lower than −3°F (−19.4°C) nor higher than 43°F (6.1°C). The time required for the temperature at the center of any single specimen to be reduced from 37 to 3°F (2.8 to −16.1°C) shall be not less than one half of the length of the cooling period, and the time required for the temperature at the center of any single specimen to be raised from 3 to 37°F (−16.1 to 2.8°C) shall be not less than one half of the length of the heating period. For specimens to be compared with each other, the time required to change the temperature at the centers of any specimens from 35 to 10°F (1.7 to −12.2°C) shall not differ by more than one sixth of the length of the cooling period from the time required for any specimen and the time required to change the temperature at the centers of any specimens from 10 to 35°F (−12.2 to 1.7°C) shall not differ by more than one third of the length of the heating period from the time required for any specimen.

NOTE 5—In most cases, uniform temperature and time conditions can be controlled most conveniently by maintaining a capacity load of specimens in the equipment at all times. In the event that a capacity load of test specimens is not available, dummy specimens can be used to fill empty spaces. This procedure also assists greatly in maintaining uniform fluid level conditions in the specimen and solution tanks.

The testing of concrete specimens composed of widely varying materials or with widely varying thermal properties, in the same equipment at the same time, may not permit adherence to the time-temperature requirements for all specimens. It is advisable that such specimens be tested at different times and that appropriate adjustments be made to the equipment.

5.3 The difference between the temperature at the center of a specimen and the temperature at its surface shall at no time exceed 50°F (27.8°C).

5.4 The period of transition between the freezing-and-thawing phases of the cycle shall not exceed 10 min, except when specimens are being tested in accordance with 8.2.

6. Sampling

6.1 Constituent materials for concrete specimens made in the laboratory shall be sampled using applicable standard methods.

6.2 Samples cut from hardened concrete are to be obtained in accordance with Practice C 823.

7. Test Specimens

7.1 The specimens for use in this test method shall be prisms or cylinders made and cured in accordance with the applicable requirements of Method C 192 and Specification C 490.

7.2 Specimens used shall not be less than 3 in. (76 mm) nor more than 5 in. (127 mm) in width, depth, or diameter, and not less than 11 in. (279 mm) nor more than 16 in. (406 mm) in length.

7.3 Test specimens may also be cores or prisms cut from hardened concrete. If so, the specimens should not be allowed to dry to a moisture condition below that of the structure from which taken. This may be accomplished by wrapping in plastic or by other suitable means. The specimens so obtained shall be furnished with gage studs in accordance with Test Method C 341.

7.4 For this test the specimens shall be stored in saturated lime water from the time of their removal from the molds until the time freezing-and-thawing tests are started. All specimens to be compared with each other initially shall be of the same nominal dimensions.

8. Procedure

8.1 Immediately after the specified curing period (Note 6), bring the specimen to a temperature within −2°F and +4°F (−1.1°C and + 2.2°C) of the target thaw temperature that will be used in the freeze-thaw cycle and test for fundamental transverse frequency, weigh, determine the average length and cross section dimensions of the concrete specimen within the tolerance required in Test Method C 215, and determine the initial length comparator reading (optional) for the specimen with the length change comparator. Protect the specimens against loss of moisture between the time of removal from curing and the start of the freezing-and-thawing cycles.

NOTE 6—Unless some other age is specified, the specimens should be removed from curing and freezing-and-thawing tests started when the specimens are 14 days old.

8.2 Start freezing-and-thawing tests by placing the specimens in the thawing water at the beginning of the thawing phase of the cycle. Remove the specimens from the apparatus, in a thawed condition, at intervals not exceeding 36 cycles of exposure to the freezing-and-thawing cycles, test for fundamental transverse frequency and measure length change (optional) with the specimens within the temperature range specified for the tempering tank in 4.6, weigh each specimen, and return them to the apparatus. To ensure that the specimens are completely thawed and at the specified temperature place them in the tempering tank or hold them at the end of the thaw cycle in the freezing-and-thawing apparatus for a sufficient time for this condition to be attained throughout each specimen to be tested. Protect the specimens against loss of moisture while out of the apparatus and turn them end-for-end when returned. For Procedure A, rinse out the container and add clean water. Return the specimens either to random positions in the apparatus or to positions according to some predetermined rotation scheme that will ensure that each specimen that continues under test for any length of time is subjected to conditions in all parts of the freezing apparatus. Continue each specimen in the test until it has been subjected to 300 cycles or until its relative dynamic modulus of elasticity reaches 60 % of the initial modulus, whichever occurs first, unless other limits are specified (Note 7). For the optional length change test, 0.10 % expansion may be used as the end of test. Whenever a specimen is removed because of failure, replace it for the remainder of the test by a dummy specimen. Each time a specimen is tested for fundamental frequency (Note 8) and length change, make a note of its visual appearance and make special comment on any defects that develop. When it is anticipated that specimens may deteriorate rapidly, they should be tested for fundamental transverse frequency and length change (optional) at intervals not exceeding 10 cycles when initially subjected to freezing and thawing.

NOTE 7—It is not recommended that specimens be continued in the test after their relative dynamic modulus of elasticity has fallen below 50 %.

NOTE 8—It is recommended that the fundamental longitudinal frequency be determined initially and as a check whenever a question exists concerning the accuracy of determination of fundamental transverse frequency, and that the fundamental torsional frequency be determined initially and periodically as a check on the value of Poisson's ratio.

8.3 When the sequence of freezing-and-thawing cycles must be interrupted store the specimens in a frozen condition.

NOTE 9—If, due to equipment breakdown or for other reasons, it becomes necessary to interrupt the cycles for a protracted period, store the specimens in a frozen condition in such a way as to prevent loss of moisture. For Procedure A, maintain the specimens in the containers and surround them by ice, if possible. If it is not possible to store the specimens in their containers, wrap and seal them, in as wet a condition as possible, in moisture-proof material to prevent dehydration and store in a refrigerator or cold room maintained at 0 ± 3°F (−17.8 ± 1.7°C). Follow the latter procedure when Procedure B is being used. In general, for specimens to remain in a thawed condition for more than two cycles is undesirable, but a longer period may be permissible if this occurs only once or twice during a complete test.

9. Calculations

9.1 *Relative Dynamic Modulus of Elasticity*—Calculate the numerical values of relative dynamic modulus of elasticity as follows:

$$P_c = (n_1^2/n^2) \times 100$$

where:

P_c = relative dynamic modulus of elasticity, after c cycles of freezing and thawing, percent,
n = fundamental transverse frequency at 0 cycles of freezing and thawing, and
n_1 = fundamental transverse frequency after c cycles of freezing and thawing.

NOTE 10—This calculation of relative dynamic modulus of elasticity is based on the assumption that the weight and dimensions of the specimen remain constant throughout the test. This assumption is not true in many cases due to disintegration of the specimen. However, if the test is to be used to make comparisons between the relative dynamic moduli of different specimens or of different concrete formulations, P_c as defined is adequate for the purpose.

9.2 *Durability Factor*—Calculate the durability factor as follows:

$$DF = PN/M$$

where:

DF = durability factor of the test specimen,
P = relative dynamic modulus of elasticity at N cycles, %,
N = number of cycles at which P reaches the specified minimum value for discontinuing the test or the specified number of cycles at which the exposure is to be terminated, whichever is less, and
WO
M = specified number of cycles at which the exposure is to be terminated.
300

9.3 *Length change in Percent (optional)*—Calculate the length change as follows:

$$L_c = \frac{(l_2 - l_1)}{L_g} \times 100$$

where:

L_c = length change of the test specimen after C cycles of freezing and thawing, %,
l_1 = length comparator reading at 0 cycles,
l_2 = length comparator reading after C cycles, and
L_g = the effective gage length between the innermost ends of the gage studs as shown in the mold diagram in Specification C 490.

10. Report

10.1 The report shall include such of the following data as are pertinent to the variables or combination of variables studied in the tests:

10.2 *Properties of Concrete Mixture:*

10.2.1 Type and proportions of cement, fine aggregate, and coarse aggregate, including maximum size and grading (or designated grading indices), and ratio of net water content to cement.

10.2.2 Kind and proportion of any addition or admixture used.

10.2.3 Air content of fresh concrete.

10.2.4 Unit weight of fresh concrete.

10.2.5 Consistency of fresh concrete.

10.2.6 Air content of the hardened concrete, when available.

10.2.7 Indicate if the test specimens are cut from hardened concrete, and if so, state the size, shape, orientation of the specimens in the structure, and any other pertinent information available.

10.2.8 Curing period.

10.3 *Mixing, Molding, and Curing Procedures*—Report any departures from the standard procedures for mixing, molding, and curing as prescribed in Section 7.

10.4 *Procedure*—Report which of the two procedures was used.

10.5 *Characteristics of Test Specimens.*

10.5.1 Dimensions of specimens at 0 cycles of freezing and thawing.

10.5.2 Weight of specimens at 0 cycles of freezing and thawing.

10.5.3 Nominal gage length between embedded ends of gage studs, and

10.5.4 Any defects in each specimen present at 0 cycles of freezing and thawing.

10.6 *Results:*

10.6.1 Values for the durability factor of each specimen and for the average durability factor for each group of similar specimens, and the specified values for minimum relative dynamic modulus and maximum number of cycles (Note 11).

10.6.2 Values for the percent length change of each specimen and for the average percent length change for each group of similar specimens (Note 11).

10.6.3 Values of weight loss or gain for each specimen and average values for each group of similar specimens, and

10.6.4 Any defects in each specimen which develop during testing, and the number of cycles at which such defects were noted.

NOTE 11—It is recommended that the results of the test on each specimen, and the average of the results on each group of similar specimens, be plotted as curves showing the value of relative modulus of elasticity or percent length change against time expressed as the number of cycles of freezing and thawing.

NOTE 12—No relationship has been established between the frost immunity of specimens cut from hardened concrete and specimens prepared in the laboratory.

11. Precision

11.1 *Within-Laboratory Precision (Single Beams)*—Criteria for judging the acceptability of durability factor results obtained by the two procedures in the same laboratory on concrete specimens made from the same batch of concrete or from two batches made with the same materials are given in Table 1. Precision data for length change (optional) are not available at this time.

NOTE 13—The between-batch precision of durability factors has been found to be the same as the within-batch precision. Thus the limits given in this precision statement apply to specimens from different batches made with the same materials and mix design and having the same air content as well as to specimens from the same batch.

NOTE 14—The precision of this method for both procedures has been found to depend primarily on the average durability factor and not on the maximum N or minimum P specified for terminating the test nor on the size of the beams within limits. The data on which these precision statements are based cover maximum N's from 100 to 300 cycles, and minimum P's from 50 to 70 percent of E_0. The indexes of precision are thus valid at least over these ranges.

11.1.1 The different specimen sizes represented by the data include the following: 3 by 3 by 16-in; 3 by 3 by 16¼-in.; 3 by 4 by 16-in.; 3½ by 4½ by 16-in.; 3 by 3 by 11-in.; and 3½ by 4 by 16-in.; and 4 by 3 by 16-in. The first dimension given represents the direction in which the specimens were vibrated in the test for fundamental transverse frequency. The most commonly used size was 3 by 4 by 16-in.

11.2 *Within-Laboratory Precision (Averages of Two or More Beams)*—Specifications sometimes call for comparisons between averages of two or more beams. Tables 2 and 3 give appropriate standard deviations and acceptable ranges for the two procedures for two averages of the number of test beams shown.

11.3 *Multilaboratory Precision*—No data are available for evaluation of multilaboratory precision. It is believed that a multilaboratory statement of precision is not appropriate because of the limited possibility that two or more laboratories will be performing freezing-and-thawing tests on the same concretes.

Appendix 5
List of Properties with Polished Samples on Display at MNDM Core Library, Tweed, Ontario

List of Polished Samples.
Eastern Ontario Building Stone Survey

Property No.	Sample No.	Township	Rock Type
86-BEL-001	[illegible]	Belmont	granite
85-BUR-001	74	Burleigh	porphyritic granite
86-CHA-001	64	Chandos	granite
86-CLA-001	83	Clarendon	granite
85-DAR-001	18	Darling	serpentinized marble
86-DEN-001	62	Denbigh	granite
85-DUN-001	[illegible]	Dungannon	dolomitic marble
86-DUN-001	13	Dungannon	stromatolitic marble
86-ELZ-004	51	Elzevir	granite
86-FAR-020	[illegible]	Faraday	marble breccia
86-FAR-021	[illegible]	Faraday	calcitic marble
86-FLL-005	13	Front of Leeds & Lansdowne	syenite
86-GRI-005	81	Grimsthorpe	syenite
86-HIN-001	54	Hinchinbrooke	anorthosite
85-HUG-002	20, 21	Hungerford	dolomitic marble
85-HUN-001	17	Huntingdon	limestone
85-HUN-004	61	Huntingdon	serpentinized marble
85-KAL-001	15	Kaladar	anthophyllite-bearing ultramafic
86-KAL-009	57	Kaladar	quartz pebble conglomerate
86-KEN-030	58	Kennebec	dolomitic marble
86-MAD-010	50	Madoc	granite
86-MAD-030	3	Madoc	marble breccia
85-MAR-002	8	Marmora	calcitic marble
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